THE MANKIND QUARTERLY

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Family, Kin and City-State

Numa Denis Fustel de Coulanges

Edited and Abridged by J. Jamieson

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The Olympian gods were not the sole source of religion in ancient Greece and Rome. Sociologically more important by far was the worship of the lineage, symbolized by the hearth fire and the reverence in which the ancestors were held.

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Cover Picture: Head of Europoid mummy with Nordic characteristics from Cherchen in the Tarim Basin, Eastern Central Asia, circa 2500-2000 B.P. (The mouth has fallen open despite the chin strap applied before burial to keep it closed). [*See article*: The Riddle of the Tarim Basin Mummies].

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Al- and *Albho-*.

Philip Thornhill*
Clapton, London

Albho-, 'white', is often analysed as *al-* plus a suffix *–bho*. (Pokorny 31; Whatmough 31; Chantraine 67; Dauzat 1978: 104; Rostaing: 45). Meillet (20) suggests Latin *albus* contains the same suffix as, for instance, Latin *super-bus* (Meillet 668), "qui se trouve au-dessous" and *probus*, from **pro-bho-s*, "qui pousse bien".[1] Outside Latin one can find it in, for instance, Greek -, 'deer (hart or hind)' from **el-n-bho-s*[2] and Lithuanian *rai-bas*, 'bespeckled, grey coloured' (compare *rai-nas* 'grey-colour striped'). This latter, together, with Late Latin (from Gaulish ?) *gal-bus* (Meillet 266), 'pale green, yellow' (from **ghelwo* as in Old High German *gelo*, 'yellow' and other words[3] suggested to Pokorny (31) and others (e.g. Meillet: 20) that the *–bho* element was a suffix typically applied to words for colours . The first element, *al-*, therefore, would also mean 'white', or 'bright, shiny'. As to the suffix , *-bho*, Otrebski (1963) interpreted it as from an original form with a long vowel: *bhâ*[4] , a variant of the root *bhç*, 'to shine'. The long vowel form features in Old Slavic *bìlú*, 'white'; Old Indian *bhâla*, 'shine'; Old Icelandic *bâl*, 'flame'; while the short vowel form occurs in Greek , 'white' (, in Hesychius); , 'to make bright' (in Hes.); Lithuanian *bãlas* or *balà*, 'anemone'; and *báltas*, 'white'. He therefore interprets the root *albho* as a 'reduplication', consisting

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[1] Meilet 537: comparing the **pro* in Old English *from*, "de bon qualité", Old High German *fruma*, "utilité"; Old Icelandic *framr* "qui est au premier rang" and Greek , 'foremost man' .

[2] Compare *<el-n-os*, 'red deer calf"; Welsh *elain*, 'hind', Lithuanian *elnis, elnias*, 'red deeer, hart, elk' etc.: Pokorny: 303-4.

[3] See Meillet 266. He compares also Latin *heluos, holus,* "inter rufum et album" (pp. 291, 297); Greek , 'greenish'; Lithuanian *zelvas*, 'green'; Sanskrit *harih*, 'yellow, green'; and also Late Latin *giluus* 'isabelle' (p. 275).

[4] He compares **-dho-* in Old Indian *sam-dha-m*, 'union, association' and Lithuanian *iñ-das* 'vessel, container', alongside *dhç* in in Old Indian *dadhâti*, 'places'; and Lithuanian *déti*, 'to place, to lay'.

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of two roots both with the same meaning: something which he identifies in other words denoting colour.[5]

As regards the first element, *al-*, Pokorny (31) notes that there is a two syllable variant to this in, for example, Greek (cf. I, note 30, above)[6]. This would be consistent, he suggests, with an original root (or a root *al-*, otherwise extended) **aleu-* or *alu-*, whence *alo(u)-*, as found in Lithuanian *álvas*, 'tin'; Latvian *alvs, alva*; Old Prussian *alwis*; West Russian *olovo*; Czech *olovo*; Serbo-Croat *olovo*; all meaning 'lead' (and all from Indo-European *aleu-o* ? See Pokorny: 31; Fraenkel: 6). All of these would then derive from the sense of 'white metal'. Pokorny (31) also identifies the root *al-* in various Western Indo-European plant and fish names as well as in the Celtic river (divine, tribal, and settlement) name 'Alauna' (cf. Rivet: 243-7)[7]. Evans, following Whatmough, would identify an element *al-*, 'white', closely comparable to *alb-*, 'white' in some words found in Gaulish.[8] Whatmough was, to some extent, following Bertoldi who had identified an element *al-*, 'white' in various Romance words (for plants, birds and foodstuffs) that he thought originated in a pre-Romance strata, and which were often directly equivalent to words of identical meaning in *alb-*.[9] Various other

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[5] On this basis one would presumably have to interpret the other words in *-bho-* along the lines: *superbus*, 'one who shines above'; *probus*, 'one who shines with virtue'; , 'radiant with a deer-like quality' ?? (perhaps just feasible); although 'one who shines with' might perhaps have developed a more generalized sense of 'one with the quality of', or similar.

[6] And perhaps in Armenian *alauni*, dove, if this is to derived from **alabh-n-*, (cf. Chantraine: 67 with *alawini* < *ale-bh-n*) though it might derive from **aleu-n-*, cf. below.

[7] Armenian *alauni*, 'dove' (but see above, note 6); fish names such as Gaulish *alausa* (cf. Whatmough: 207), 'shad' and Anglo-Saxon *alund*, 'whitefish'. For 'Alauna' as theonym, Whatmough § 243, 211, with related ethnicon (236): these and widespread toponyms all related to the river name 'Alauna/os', see Rivet: 243-7, Guyonvarc'h 196, and further below.

[8] Evans: 302 suggests the *alb-* of *albuca*, etc.. is equivalent to the *al-* of *alica* = 'spelt, spelt grits' or 'a drink prepared from spelt' (cf. Meillet 21; Chantraine: 61), = 'white poplar' (cf. Chantraine 61) and *alutia* = 'metallum aurarium'. He follows Whatmough § 1, 158, 178.

[9] Bertoldi 1930: he lists as equivalent to Latin *albarus* for 'white poplar': Macedonian (from Celtic ?) ; to Latin *albucus* (< Catalan *abuch*) for 'asphodel': perhaps Greek ('white flower' in Hesychius), Southern French *alegue, alapedo, alevro, aledro* (these for either asphodel or vitalba); to French *albié* (< *albus*) for

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bird and tree/plant names contain an element *al-*, and, in fact, the list of plant and animal words is arguably more convincingly coherent, and certainly considerably extended, if we bracket the root *al-*, with *el-/ol-* as does Pokorny[10] . Celtic and Latin words for 'swan', for instance, can be seen as containing an element *el-* and Meillet associated this with Bertoldi's *al-*, meaning 'white', thereby offering a parallel to the *alb-* in Germanic *albiz*, 'swan'[11] .

We need to bear in mind, however, that we have already suggested, that *alb-* goes back to a very early strata of Indo-European, so the addition of the suffix, *-bho* to *al-* would go back to that early date. More importantly, since we also identified *albho- lbho* > Rbhu) in its earliest context as a theonym then it would also seem likely that in the case of *al-*, too, the meaning 'white, bright' was closely associated with a divine name function (which might not impossibly have been primary). A divine name, perhaps typically appropriate to a solar deity (or a word meaning, '(solar)god', 'god-like', 'to be divine' ?) might arguably combine well with a suffix meaning 'bright, radiant', whilst it is quite possible to imagine metals in early times regarded as 'a material imbued with

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the 'sevice tree, alder' (sorbus aria): French *alisier, aliquier, alofrier* (cf. "Macedonian" for 'white poplar'; see also Bertoldi: 1927); to Dioscourides' *albinus* for "absinthe": Antimus's *aloxinum* (cf. the gloss "absentius id est alosanus"); to Walloon *abie, aubeye* (< *albus*) for 'alose' (a type of fish): Latin from Celtic *alausa* (cf. Sardinian *alaussa*, 'white mustard', 'Sinapis Alba'). Other words he suggests contain *al-*, 'white' are Latin *alica*, Greek , 'white flour' (cf. Greek , 'pearl barley, barley meal'); *alosanus* for a white herb; Latin *alucus*, 'screech owl' (arguing it to be more than just a corruption of *ulucus*); medieval French *alocis*, Ligurian Italian *la lasra, l'(a)lasroga*, Sicilian *alastra*, French *alête* for 'broom'. He argues that *alofrier, alofra* contains a pre-Celtic suffix in *-st-* (*-f-* < *-s-* < *-ss-* < *-st-*) though as Hubschmid demonstrates suffixes of early origin were sometimes applied later to Latin-derived words.

[10] Pokorny: 302-4 notes that words for 'swan' and 'seabird' might contain *al-*, 'white', rather than his root *el-*, denoting colour in birds, animals, trees, etc.: while also noting the possibility that both roots might ultimately be identical. He places here , cf.. notes 7 and 8, above.

[11] Meillet: 461: Latin *olor* (< **elor*); Irish *ela*; 'swan'; Welsh *alarch* (plural *eleirch* < **alarki* : *GPC* 74): for the *a* in the Welsh form where we would expect *e*, see Schrijver 1994: 76. Cf. to these, Old High German *albiz, elbiz*; Old Church Slavic *lebedú*, from Old Slavic *olb-edú*; both from Indo-European **albhedis*. That this root is associated in Slavic with a meaning 'white' is suggested by Russian *lebedá*, Polish *lebioda, ≥oboda*, 'goosefoot', "named for the shape of its leaves in English and for the silvery deposit on its leaves in Russian". See Pokorny: 30; Wade: 106.

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the magic of the gods' and also plants and animals defined in terms of their relationship to a god, or 'the divine', of which – as many mythologies demonstrate – they were often regarded as a manifestation.

This would put Pokorny's plant and animal names in *al-/el-/ol-* in a rather different context. But there are reasons to question his analysis in this respect, anyway. For a start his rationale for bracketing (on an admittedly tentative basis) *al-* with *el-/ol-* depends on the hypothesis of the origin of *al-*, here, in a 'reduced grade' of an original proto-Indo-European *el-* (which, of course, we would expect to have ablaut variants in *ol-* and *l*). This 'reduced grade' - especially with a consistent outcome in the modern dialects as *a* - might now be doubted by many (Beekes: 164; Lehman: 132-3). One would now have to assume a different proto-Indo-European root (one with an a-colouring laryngeal: thus *h2el-*) for *al-* - if primary - to the one for *el-/ol-*. [12]

In any case Pokorny's basic categorization on the basis of a root *el/ol-* meaning 'grey/yellow/brown' (possibly extending to include *al-*, and a meaning, 'white') has been doubted by many, especially since the supposed Indo-Iranian cognate to Old High German *elo* (< **elwa*) 'brown, yellow' seems to be better explained in a different way (Polomé: 33-4). In fact Bertoldi had anyway identified his root, *al-*, 'white', as belonging to the pre-Celtic, implicitly pre-Indo-European, substrate. That might seem to conflict with our idea that alongside the *al-* of *al-bho* was an unsuffixed INDO-

[12] As regards the possibility that the *al-* in *albho* might represent an original root in *el-/ol-/l-*, from *h1el-* (or, say, *ol-*, *l-* from *h3el-*): the *al-* in Germanic *albho* might represent original *ol-*, as might the *al-* in Hittite *alpaas* (although the relationship of that form to *albho* has, in any case, been doubted) while we have suggested that the *albh(i)o* in Celtic is likely to represent a borrowing from Ligurian or other earlier Indo-European dialects. However the Latin *albus* definitely cannot be derived from *el-/ol-/l* by conventional linguistic rules. If that were to represent some kind of exceptional secondary change of *el-*, *ol-* or *l-* to *al-* then there is also the *al-* in Greek - which must represent original *h2(e)l*, according to modern linguistic theory (Schrijver 1991: 56). Meanwhile it remains striking that no single (feasibly related) form in *elbho*, *olbho*, or *ulbho/ilbho*, has been recorded (but for the , equivalent to , in a toponymic context, see note 15). All this confirms that the *al-* in *albho* derives from a root with an a-colouring laryngeal. The Germanic forms (not only for 'swan', above note 11, but also 'elf', Elbe, etc..) prove that we have the full grade form of *h2el* (cf. Schrijver: 40, no. 19 contra 66, no. 5): in contrast to the zero grade in Vedic Rbhu <. *h2lbho* < *h2elbho*. But for the possibility we have *h4* rather than *h2*, see Part I, note 35.

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EUROPEAN *al-*, meaning 'white'. It is a fact, though, that recent studies have tended to confirm the importance of the contribution of the pre-Indo-European substrate to the North West European languages (Hamp 1979; 1986; 1987,1990; Polomé 1986;1990a; 1990b; Huld 1990 ; Beekes 1996; Boutkan 1998). There is room for considerable re-categorisation in this direction[13] given the bias created by the fact that the vast bulk of comparative evidence comes from Indo-European languages. In any case, of the words listed by Pokorny, Polomé (1990a) and Huld (1990) for instance, would place *aliso* (as the common prototype for various words in Baltic, Slavic, Germanic and Celtic, denoting the alder, or similar types of tree: Friedrich: 70-2) in a category of words describing the local environment or ecology likely to belong to the substrate: even if not supporting Bertoldi's notion that it contained *al-*, 'white'. We have raised, above, the possibility that the notion of 'bright, white' might be typically associated with, and merge into, a notion of 'the divine' or 'divinely associated', which would significantly broaden, or loosen, the kind of semantic category we might consider. In any case, the possibility must exist that, along with *aliso*, various other of Pokorny's words in *al-*, 'white' (or grey-yellow-brown) might actually derive from the substrate: Bertoldi, for instance, placed the fish-name, *alausa*, there.

The river name 'Alauna', meanwhile, which is subject to varying interpretations was regarded by Rostaing and Dauzat (1978: 18,19) as containing a widespread pre-Indo-European hydronym *al-*. In fact they saw a related element in oronyms (104-5; cf. Flutre: 122, note 1) and analysed the toponyms in *Alb-* and *Alp-*, as from *Al-* plus *b/p*. Whatever the origin of 'Alauna' in particular (see further below) the existence of a pre-Indo-European root *al-* is, in the most general terms, not unlikely, in the sense that the simpler the root the more likely it is to belong to ANY language. The existence of at least some toponyms in pre-Indo-European *al-* would seem likely enough: the mountain-names in *al-* of the Mediterranean region (Dauzat 1978: 104-5) might be the most likely candidates. Furthermore this might be significant for us, since toponyms are so often closely associated with theonyms: which might allow some semantic point of contact between our Indo-

[13] Cf., e.g., Beekes 1996: 235: "Indo-European linguists have failed to recognise the importance of the non-Indo-European element in the lexicon of the Indo-European languages, and thus neglected a task and missed opportunities".

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European, and any pre-Indo-European *al-*. It might also provide some kind of hypothetical basis for Bertoldi's notion that there was a pre-Indo-European *al-*, meaning 'white', because associated with divine names might quite typically be the notion of the 'radiant, solar-radiant, bright, white' (: the suggestion here would be that the adjectival, colour function was secondary to the divine name function along the lines that we have begun to suspect for the *al* in *albho*). Of course any pre-Indo-European root *al-*, especially if it had some degree of semantic overlap with our Indo-European *al-*, might have tended to merge with it – or, put another way, be reinterpreted in terms of it.

Clearly we cannot, at this point, offer any direct connection between any pre-Indo-European root *al* and the *al* of *albho*, which we have identified as Indo-European. However we might offer the suggestion that in the relationship of *al* to *albho* as in that of the latter to *albi()o,* we are, to some extent, dealing with different strata of language. The underlying reality might be a rather complex one characterized by assimilation between Indo-European *al-* and phonetically similar substrate forms, perhaps encouraged by some degree of semantic overlap in the general area of the 'divinely associated', 'radiantly divine', 'bright', 'solar-clestial'[14] (although in an onomastic context the substrate forms need not necessarily have preserved any semantic connotations). It might also be the case that *al-* from either source became assimilated to *albho-*, but it might be that, most typically it was pre-Indo-European *al-* that became assimilated to - and/or was translated by – *albho*, as the latter languages spread. This kind of assimilation might be most likely in the case of toponyms and related theonyms, because these were the elements of the substrate lexicon most likely to be retained by incoming Indo-Europeans long enough to be subject to gradual reinterpretation – as well as, perhaps, being the most likely context in which pre-Indo-European *al-* will have had the divine associations that might have matched those of Indo-European *albho*. The toponymic root, *alb-* (and also sometimes *alp-*) has often been seen as pre-Indo-European (e.g. Whatmough: 31; 1951: 79): we have not subscribed to that view but the above hypothesis goes some way towards it since we would see many toponyms in

[14] This kind of assimilation might have occurred, of course, at more than one stage in the diffusion/fragmentation of the Indo-European dialects.

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alb- as having had, in their local context, an ultimate origin in pre-Indo-European *al-*[15] .

Given that Pokorny's list of plant and animal names in *el-/ol-/al-* : might contain several substrate forms there is the possibility of some quite complex picture of cross-assimilative linkages in this context, too. Polomé suggested that words for 'elm' (suggestive of an original *lmo*, in Latin, Germanic, Celtic and Slavic: Friedrich: 80-4) might belong to the same substrate category as *aliso.*[16] Out of Pokorny's tree words in *el-/ol-al-* etc. that leaves words in *el(-w-n)* for cedar, juniper and fir trees (in Armenian, Greek, and Slavic).[17] None of Pokorny's tree names in *el-/ol-/al-* contained any Indo-Iranian cognates: even with transferred meaning. In theory all these tree names could have been acquired from the first Western non-Indo-European people that the Indo-Europeans came into contact with (carried thence to Greece and Armenia in the case of the cedar/juniper names). However it would be a very radical hypothesis that saw absolutely zero Indo-European input here. Certainly Pokorny's words for deer in *el-/ol-*, which do contain an Indo-Iranian cognate (transferred to denote the antilope) remain a convincing Indo-European group, although nothing very convincing attatches them to the tree names[18] .

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[15] We have aleady suggested that the 'p' in 'Alpes' represents substrate influence (I, note 34, above). This is consistent with a pattern of interaction between substrate languages and Indo-European (one might envisage a bi-lingual context: perhaps resolving into a single substrate-influenced dialect of an Indo-European language). The o in the that is equivalent to (see Whatmough 1931: 144; cf. Rostaing: 67-8) might likewise represent some lingering substrate influence: perhaps an original substrate sound that lay somewhere between a and o (cf. Hamp, note 19, below). For see below note 58.

[16] Polomé 1990a. He notes that another Indo-European word for 'elm' which "seems to spread over the whole Indo-European area, with an Eastern bias" (Iranian, Albanian, Baltic, Slavic, Germanic) might represent the original Indo-European term, whilst "in Northern Europe the widespread mountain elm remained known under its local name Vlmo".

[17] See Friedrich 44-8, with an explanation, there, for the different meaning, 'fir tree', in Greek.

[18] Adams (1985b), though, seems to cast some doubt on the relationship between the roots *olki* and *elEen* (usually classed together as by Pokorny). The latter root was restricted to the Western dialects and Tocharian, and in the Baltic ones signified the elk as well as the red deer so it is possible that both words were

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What we might in fact have, though, is some quite complex history of interaction between Indo-European and non-Indo-European forms: something which might be especially likely if there was, in fact, some kind of ultimate genetic relationship between these two groups (for which see below note 24: one might be thinking especially of neighbouring languages to 'Proto-Indo-European', at an early date). Indo-European words that found some resonance in terms of similar (distantly related ?) substrate forms might have been (substituted for them and so) selectively favoured. Alternatively indigenous words that were not entirely opaque, or were vaguely familiar, to Indo-Europeans might have been adopted by them, though perhaps sometimes Indo-Europeanised in the process. An outstandingly unique characteristic of Indo-European seems to have been the prevalence of roots with original 'e' vocalization, so we might expect our original Indo-European forms to have typically contained *el* or its ablaut variations in *ol* or *l*, whilst those in original *al-* might have been more likely to belong to the substrate. Some Indo-European vowels were coloured to 'a' by neighbouring laryngeals, of course, but if the Western languages, that Indo-European first came into contact with, really were in any way related, then what they would be least likely to still have in common might be the extraordinarily dominant 'e' vocalisation (subsequently diversified by ablaut) of Indo-European. There might have been, then, some correspondence between Indo-European words in *el-/ol/l* - and non-Indo-European words (otherwise still vaguely similar in form and meaning) of alternative vocalization, like 'a' [19]. Substrate words with *a* (or similar) might have been 'Indo-Europeanised' with an alternative vocalisation in *e* (or *o*); or might have tended to be replaced by vaguely similar forms (thus selectively favouring their retention in the lexicon) but with different vocalisation (in *e* again, or *o*). What we might have had then, in effect, is some degree of assimilation not only between pre-Indo-European *al-* and Indo-European *al-* (and *albho*) but also between the former and Indo-European *el-/ol-/l*.

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originally identical in meaning. It might be significant, if that were the case, that the root *elEen* is one of many roots (and linguistic features) shared by the Western dialects with Tocharian.

[19] Or a sound that could be interpreted as *a* by Indo-Europeans: according to Hamp's theory (1979, contrast Adams 1985a; 1990) the North West substrate had a characteristic vowel sound , interpreted alternately as *a* or *o* by Indo-Europeans and explaining why the Germanic, Baltic and Slavic branches levelled *o* and *a*.

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At any rate while we have found it difficult to see how the *el-* in Latin and Celtic words for swan can be regarded as representing the same root as the *al-* in *albho* (without invoking a 'reduced grade') it is possible to imagine a substrate word for swan (with associations of the divine and/or whiteness ?) in *al-* that was reinterpreted by North Western Indo-Europeans (Germans, Slavs) in terms of *albho*, but by South Western Indo-Europeans (Celts, Italics) in terms of *el-*. One might note, in this context, that the seabirds included in Pokorny's list all have names in *al-*, as well as being native to the North West European seaboard (probably outside the original homeland of the Indo-Europeans) and as such represent good candidates to bear substrate-derived names. Greek , 'mythical bird', which Pokorny places in this group "pourrait etre une terme méditerranéan emprunté", according to Chantraine (but cf. note 49, below).

But whatever the truth about the relationship between these forms in
al- and *el-/ol-/l* more important to us will be the theo-toponym 'Alauna'. As we have seen Rostaing and Dauzat would place it in the same category as a large number of other river names containing a pre-Indo-European root *al-*. Their approach might now seem dated and they have been criticized for having a far too cavalier attitude to the identification of pre-Indo-European roots (particularly in the case of those roots to which no meaning could be assigned). However, whilst their conclusions in detail might often be questioned or rely on too little evidence to be reliably proven it is another question as to whether their concept of the scale of the pre-Indo-European element in the toponymy was broadly correct (cf. Thornhill 1999: 483). As we have seen in the case of Bertoldi and *aliso*, some modern studies are tending to support at least some aspects of earlier studies that emphasized the importance of the substrate.

In the case of Alauna, however, Krahe (in his influential work supported by e.g. Nicolaisen), whilst accepting that it should be categorized together with a large number of other hydronyms in *Al-* would assign them all (together with a large number of other widespread hydronymic roots) to an early strata of Indo-European they call 'Old European'. They would place many river names in this category that Rostaing and Dauzat would identify as based on pre-Indo-European roots. They note that many of the features of the suffix system, common to a large number of river names (which

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they categorise together on this basis) are typically Indo-European (cf. Kitson 1996:82). On this basis they analyse Alauna, in parallel with other river names, as a *–no/na-* extension of *al* + *awa*, where the *al-* comes from a root *el-/ol-* 'to flow, to stream' (Krahe: 1953; 1963: 308 ff; 1964: 35-8; Nicolaisen 1958: 225-8; 1976: 186-7). This is one of various interpretations of Alauna in terms of an Indo-European root that denotes the movement of water: others are *(p)el-*, 'faire aller, pousser en avant' (e.g. Flutre: 121-5) and *al-* 'to wander about' (cf. Pokorny 27-8). Note that these two are likely to describe quite different types of river, respectively. Krahe's suggestion, though, is consistent with his overall hypothesis in the sense that it is based on the relationship between certain water words and hydronyms of the Baltic region which is often thought to preserve a uniquely archaic form of Indo-European as well as being, at least close, to the original Indo-European homeland.

Thus Latvian *aluõts*, spring, is thought to contain the same root as the Lithuanian river name 'Alantà', on the same basis that *avuõts*, 'spring', (compare Old Indian *avatáh*, 'fountain') looks likely to contain the root of the Lithuanian river name 'Avantà' (Krahe 1953: 50-1, 113, 1964: 35; Jonikas: 14; Fraenkel: 6). Both of these river names contain the Indo-European participal formation, *-nt-*, that Krahe identifies as typical of Old European river names (cf. Kitson: 82). *Aluõts*, in turn, is seen by Krahe (1964:35) as containing a root which features in Lithuanian *aléti*, 'flooded with water' (or 'sprayed with water'; Jonikas: 14); *alméti*, 'to flow incessantly'; *almais*, ''hasty, violent'; *almes, elmes*, 'viscous material from bodies, blood serum'. On this basis a root, *el/ol* 'to flow' is deduced. Fraenkel (8), however, links the last of these words – together with *aluõts* – to Lithuanian *álksna*, 'puddle, swamp'; *almuõ*, 'puss'; Latvian *al(u)ksna*, 'quagmire, boggy place (especially in woods)'; Russian *olúga*, 'boggy swamp' (compare the Lithuanian river name 'Algà'), Latin *alga*[20] , 'bogweed, seaweed', Old Indian *rjîsá-*, 'sticky', slimey, smooth'. Pokorny relates some of these to other words, like Norwegian dialect *ulka*, 'sticky slime, mould', which suggest to him a root **el/ol*, 'to be mouldy, rot'[21] .

[20] Pokorny includes this in his group (note below) on the basis of a 'reduced grade'.

[21] He includes, e.g., Norwegian *ulma* and *ul*, 'mouldy'; Old Norse *ûldna*, 'mouldy'; Armenian *a≥t*, 'dirt, impurity'. Kitson quotes (86, note 18) Mann who brackets

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Cop (1953) adds other words like Greek , 'ink secreted by the cuttlefish', that restore the balance in the direction of 'wet, viscous'[22] , but, together with Fraenkel, suggest a general meaning of 'wet, viscous, unpleasantly liquid, liquid in a still or stationary form'. It is only really some of the words in *alm-*, suggestive of a root *almos* (so Krahe: 1953: 113) that contain any sense of motion, or water in motion. This might suggest that that is a sense limited to this sub-group (if it is a SUB-group).[23] The precise meaning of *aluõts*, 'spring', might have been influenced by analogy with *avuõts*. It is not surprising, meanwhile, that Kitson (p.86) is able to find other roots in *el-* (the root of Greek , 'went') to which a hypothetical *el/ol*, 'to flow', might be related given that it is such a simple and therefore potentially common root.

There are more important considerations, however. One is the fact that semantic influences need not always have been in the direction of general lexicon to 'onmasticon' but might sometimes have been in the opposite direction. Thus we have seen how *alb-* in some Germanic languages developed a general sense of 'watercourse' from its use in river names (cf. Kitson: 75), and - on our theory – from its use, more generally, for (inevitably) water-associated deities. One can imagine a similar process in the case of a root *al-* that was appropriate to river names and associated deities, and, furthermore, an extension of that process so that its semantic range broadened from 'watercourse' to 'water, things wet or liquid in general' (cf. Thornhill: note 24 and V, note 9, below). One might further envisage some kind of merger with (or cross-influences between it and) any words of vaguely similar form and meaning in the ordinary lexicon.

Another consideration is that such hypothesized roots as *el/ol* 'to flow, to stream', of suspiciously convenient wide application, are

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together Lithuanian *alm-*, 'liquor from dung'; Midle High German *elm*, 'yellow clay',; Low german *olm*, 'rotten wood', deducing a root **alm-*, 'rot, impurity'.

[22] He adds, e.g., Greek , '' in Hesychius,; and suggests an extension of the root in -*p-* (**lpâ*) under which he includes Greek , 'scum, filth', Serbian *lap*, 'marshy soil' (< Slavic olpú); armenian a≥b, 'dung' as well as Hittite alpa-s 'cloud' (comparing other words for 'cloud', derived in a parallel way); and also an extension in -â- (**lâ*) including Greek , 'eye-gum'; Slovene *láva*, 'wet depression in a river bed'; and similar.

[23] That is unless one includes Jonikas's (14) *alauöà*, (as related to *alauöai*, 'where much water collects, puddle' and the river names 'Alauõas', 'Alauõai') 'careless, hasty, man; chatterer', as denoting movement.

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likely to disguise a more complex picture. Roots that comprise such simple, and so potentially common and widespread, elements (as *al-*, *kar-*, *ar-* etc..) are especially likely to have been subject to assimilation, or reinterpretation: a process that, where records are available, can be seen as entirely typical of toponyms in general. Consequently had there been an ancient river name in *Al-* in the Baltic regions, then the chances are that (over many hundreds or thousands of years) it may well have been reinterpreted in terms of Baltic words of appropriate meaning, perhaps including a root *al-* (whether or not from a root *el/ol*) with the sense of 'wet, viscous'. We cannot be sure that that represents the ultimate origin of the name, however. Likewise whilst Krahe and others are probably right in identifying the suffixes of many of these river names as Indo-European that does not necessarily mean that the base-roots are, as well. The names might be 'Indo-Europeanised', in other words, rather than ultimately Indo-European.

One reason for thinking along these lines is that it would be consistent with what Polomé (1990a) and others (Hamp 1979; 1990; Huld 1990) have observed about the Baltic lexicon, in general, as part of the wider North West Indo-European group that seems to have absorbed many words from a pre-existent substrate language or languages. If they are correct it is inconceivable that many of the toponyms (which typically preserve substrate forms to a disproportionate degree) of the region do not originate with the substrate, too. The problem turns partly on the question of the homeland of the Indo-Europeans. If they originated in the Baltic (or a region including the Baltic) then the earliest strata of toponyms will probably be Indo-European, but if not then it may well reflect, to some degree, an earlier substrate language. There is little doubt that the Baltic regions, or the regions earlier inhabited by people speaking the Baltic dialects (extending South and well West of their current range: Mallory 82) were early Indo-Europeanised but probably the most popular theory (not, however that of Kitson and Schmid) would place the ultimate origin of the Indo-Europeans further South, in the Southern Ukraine or North East Balkans. Given the early Indo-Europeanisation, together with the lateness of the available evidence, then any substrate element in the toponymy may well be difficult to uncover: very likely heavily disguised by various processses of reinterpretation. However, Tovar (1977: 19-20), for instance, has identified the root *kar* in Baltic river names, which he interprets in terms of the widespread pre-

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Indo-European root *kar(r)*, 'a rock'. His argument is all the more credible given the quite exceptionally wide distribution of that root (for this see note 54, below).[24]

If we accept the hypothesis of a substrate origin for the oldest stratum of (even) Baltic toponyms then on the one hand Krahe's river names may, in some cases, have even more ancient origins than he, himself, proposed, but on the other they may have been more mutable: both in terms of the later suffixation (and perhaps other adaptation) of earlier roots, and - no doubt sometimes directly associated with this – their semantic reinterpretation. This allows for quite a complex picture whereby a root in pre-Indo-European *al-*, for instance, (which might, itself, represent the falling together of roots of different ultimate origin) might have

[24] Kitson's (1997: 193; cf. 1996: 98-100) arguments against him fail to take that into account. He argues that such a 'Mediterranean' root could not be found in the Baltic and its occurrence (with typical Indo-European suffixes) in Turkey and Spain could only be accounted for on the basis that it is Indo-European. This is based on pre-suppositions about a linguistic pre-history we know nothing about: there is nothing to prove that the Indo-European language group was the first such group to spread across the whole (or most) of Europe. The better attested non-Indo-European languages, of the Mediterranean, most probably originated in the culturally advanced Eastern Mediterranean/Middle East and the cultural influences that disseminated outwards from that region across the whole of Europe, bringing, for instance, agriculture in their train, may well have been associated with the introduction of new languages as well. The model would be like that of Renfrew but for a language family either other than, or only latterly incorporating, Indo-European. (I have effectively suggested - very tentatively - above, that Indo-European might have been related to the 'substrate' languages: this might be most feasible on the basis that it represented not so much the language of the 'Kurgan-culture' invaders so much as the language of the culture that emerged out of their mixing with Gimbutas's 'Old Europeans' - that phrase used by her for non- or pre-Indo-Europeans, therefore in a sense quite different to Krahe: - a 'creolised' version of an 'Old European' language: cf. Stefan Zimmer, *JIES* 16, p. 374; Kitson: 210-11). The root *kar* does not occur in Kitson's impressive list of roots that occur in river names of both Europe and Asia (note 24 on p. 218; 1996: 87-88); Hubschmid (1953: 110) identifies the root in Sanskrit, but thinks it was borrowed by Indo-Europeans from a substrate language (in East Europe, taken thence to India). Meanwhile the suffixes - once again – need not be the same age as the root. No doubt the hydronymic 'suffixing habit' spread with the Indo-Europeans: so too might, in fact, a (re-interpreted ?) root like *kar*, which they had absorbed into their typical hydronomy (cf. Hubschmid on the appelative) but at the same time, they might be likely to absorb a new native river name in *kar* into their hydronymic system, in a way parallel to that they had, elsewhere.

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been reinterpreted in more than one way (cf. Thornhill 1999: note 30): perhaps by *al-*, 'viscous, wet', in certain cases in the Baltic; perhaps in terms of the *al-* of *albho*, meaning 'bright, white', along the lines suggested by Pokorny, in other cases, or elsewhere. One might, further, have serial reinterpretation or even different interpretations by different peoples (sections or strata of the populace) at the same time. Then again, despite reinterpretation, some of the original associations – especially divine or mythological – of the old river name might remain. In fact, though these very simple (and so common) roots, like *al-*, might fequently have been subject to reinterpretation, partly as a result of the loss of their original semantic associations in an onomastic context, there might have been some consistency with which toponyms, especially for instance river names, were, by the nature of early or neolithic religion at a local level, also regarded as theonyms. Over time then, it may well be that for these ancient roots of simple form, like *al-*, it would be the theonymic (and theonym-related) associations that would tend to have come to dominate.

It is, in fact, the divine names in *al-*, and the way they relate to our divine names in *albho* that is our prime concern, here. We have already suggested, above, that, on the basis that many divine names are associated with toponyms, many might contain pre-Indo-European *Al-*. Rostaing (e.g. 1950: 56) and Dauzat, anyway, envisaged such a root as occurring in toponyms in a vast 'substrate' region extending throughout much of Europe, the Mediterranean and into the Middle East (cf. my note 24). If that is correct then we might expect that (as with *alb(io)-*, discussed in I above) alongside the toponymic function there was also a closely related divine name function: in that case we might expect the (non-Indo-European) element *Al-* to figure in divine names throughout the vast substrate region, as defined above. At the same time, as suggested above, we might expect to find Indo-European theonyms (and theonym-related words) in *al-*, as related to the *al-* of *albho*. There is, inevitably, no shortage of possible candidates for either of these categories and it may be no easy task to tell them apart: nevertheless we will attempt a brief survey in an attempt to see how these might relate to each other and to our divine names in *albho*.

We can start with the Gaulish deities 'Alaunus' and 'Alisonus'. The first is clearly related to the hydronym, 'Alauna', as discussed above (with note 6) and the second, most probably, to the toponym

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'Alesia'. Although the divine names, here, would seem to represent merely a late and secondary evolution from river, or place, name we have suggested in the context of the Alb/- divine names that such appearances can be deceptive: the evolution of these names might in fact represent a long history of inter-action between theonym and toponym so that which is ultimately primary may not be so easy to deduce.

In the case of Alauna, we have seen that Rostaing and Dauzat, and Krahe and Nicolaisen, both in their different ways, would explain it in terms of its relationship with other river names and the ancient roots associated with them. Not everyone favours such an approach and many tend to ignore the persuasive arguments (as of, e.g., Kitson 1996: 89; Schmid: 331-2) that suggest that river names might derive from words or roots not found in the language with which they seem – historically and geographically - to be associated. In any case the arguments of both Hamp and Lambert derive primarily from their respective studies of the Celtic language (and its relations to other Indo-European languages) as such, rather than on a study of other river names and toponyms (but see note 25).

Hamp (1972), for instance, derives 'Alauna' from a word for 'trout'. He cites modern Irish (Kerry dialect) *ala*, 'trout', as almost certainly derivative (by typical loss of ending: Marstrander: 372) of *alad*, 'speckled' (see Vendryes: A-58-9) and suggests that *ala-un-(o)* would be a parallel participle form to *ala-to-* (< *alad*) so deriving Alauna from a root *al-* (< *HaelH*) 'speckled'. This he thinks (with Marstrander) is found in other names of speckled fish: Old Norse *olunn*, 'mackerel' and Old High German *alant* (otherwise *alunt*) 'a kind of fish', while 'trout-river' might be credible for a ubiquitous river name (from which the divine name might typically derive).

However with *alant* comes Anglo-Saxon *alund*, 'whitefish', and Pokorny (note 7 above) actually places all of these fish names – together with homonymous Old High German *alant* as a name for 'inula, alant' (alongside Hispano-Latin *ala*) – under his root *al-*, 'white, glistening'. Both he and Bertoldi would place *alausa*, 'Mayfish' – which of the fish names looks closest to Alau-na – under a rooot meaning 'white'. Vendryes, meanwhile states that if *ala*, 'trout' has to do with these other fish names then it cannot have anything to do with *alad*, 'speckled'. The presumed root *al-*, 'speckled' is not found in Britonnic and only possibly in Gaulish.

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Vendryes suggests a root **pel-*, "bien attestée en diverses langues" as the origin of *alad*, 'speckled' but the semantic match does not look that good since it seems typically to mean 'pale, somber, grey etc..' rather than 'multi-coloured, speckled'. Since *alad* actually means 'trout' (in modern Irish), as well as 'speckled' one might wonder whether the derivation might be the other way around (trout-like > speckled) or might result from some 'croisement' of Vendryes's word with a word for the speckled trout. Alternatively we might have some merger of fish names in *al-* with a root *al-*, meaning 'burnt' (therefore 'speckled': Marstrander: 373; Pokorny: 28).

In any case if the words in *al-* for both speckled and white, fish, are related then the associations of *al-* with water – which would come from its use as a hydronym – might still be relevant to both (though they might both also, just conceivably, be thought of as 'shiny, glistening' ??): in which case the value of *al-* as a hydronym would be primary as Krahe's theory (and others) of an ancient hydronomy would suggest. Guyonvarc'h (1972:885; 1968: 360) argues that the *–au-* in *al-au-na* would typically derive, in Celtic, from *–awa-* and in this he concurs with Nicolaisen and Krahe: who point out that the expected unsuffixed (or single-suffixed) form, *alawa*, does occur in the hydronomy - in the Anglesey 'Alaw', and Cornish Porth-allow' (see further V) - as well as forms suggestive of *alawa-* with a different suffix (e.g. the Roxburghshire 'Allan', 'Alwente' in 1153-65, from *alawa-nt-* : Nicolaisen 197: 187).

Nevertheless the idea that 'Alauna' contains a participle formation is also favoured by Lambert (1991). As with Hamp it is a participle in *-uno-* , but this time from *-mno-* (rather than the zero grade of *-uen-*, favoured by Hamp)[25] . Thus he derives 'Alauna/Alouno' from the root *al-*, 'to nourish, to nurse'(as in Latin *alo*, 'to nourish', and, according to Hubschmid in 'Al-pes') and gives his participle an active meaning, 'nursing, nourishing'. However, he admits that Nicolaisen's "comparison with some place names as Welsh Alaw....is not to be dismissed". A connection with 'Alaw' (like 'Alauna', in Britain primarily a river rather than place

[25] Lambert (1994: 37) compares the 'Charente' < 'Caranto/Carantona' < *kara-nt-*, as a river name containing a typical Indo-European paticiple formation but one should note that this *-nt-* participle suffix is recognised as typical of river names (by Krahe et al) in a way that is not true of Lambert's *-mno-* participle suffix, and may have had a specialised hydronymic function..

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name) seems most likely on the basis that, as Nicolaisen suggests, 'Alauna' is from 'Alaw' plus *-no-* : at any rate the connection would be most direct on that basis. Nicolaisen (1958: 227) gives other examples from an onomastic context (unlike Lambert's *barnaumon* comparisom) of a likely close relationship between forms in *-aw-* and *-aun-* : 'Ana-va' (whence 'Annan', a river in Scotland) and 'Anauni' (tribal name from North Italy); 'Ivavos, Ivaus' (spring deity from Evaux) and 'Ivaunon', Latinised 'Ivaunum' (for Evaux, itself): 'Genawa' (for Geneva,) and 'Genauni' (for the people of Geneva). The last two must certainly be connected and show *-awa-* + *-no-* > *-aun.*

This *al-awa-* element seems likely to occur in the Gaulish fish name *alausa*, as mentioned above, and also in Welsh *alaw*, 'water lilly' (Williams 1945: 51; *GPC* 74). It seems very plausible to associate our water names in *alaw(-no-)* with these names of water-creatures or plants in *alaw(-)*. [26] This would not make too much sense, however, on the basis of a root *al-*, 'to nurse, to nourish'. The association of river, water-plant and fish, together, might rather point to a primary association of the root *al-* with water. This suggestion might be further supported by the fact that Ifor Wiliams (1945: 36) suggested that, alongside *alaw*, 'water lilly' there was in Welsh a root *al-*, meaning 'water'.

The most important consideration, however, in our investigation of this name is the fact that, as Rivet and Smith (243-4) point out, Celtic 'Alauna' is a "name of unusual diversity": it features not only as a common river name but also as a widespread settlement name, theonym and – in Noricum – ethnicon (Whatmough § 243, 211 and 236; Guyonvarc'h 1972). In fact it seems to function in a way rather parallel to the Alb- names as discussed in I, above: one might argue on this basis that it is some kind of purely Celtic equivalent to Ligurian, or pre-Celtic Indo-European, Alb- (from *albho-*). In any case Rivet and Smith (quoting Ekwal) argue that it would require some broadly applicable meaning like "holy" or "mighty" that would also be appropriate to a theonym – which, Guyonvarc'h (p.885) argues, is, in these cases of multi-functionality, normally primary. This is where Hamp's derivation from a word meaning 'trout' seems most signally, to fail to match up to requirements: if

[26] Ekwal (5) notes that the rivers Alaw have no water lillies and so cannot be named from *alaw*, 'water lilly', but that need not preclude some more indirect link between the river name and plant name.

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one might conceivably derive the theonym from the river-name from a fish-name, the use of 'Alauna' as a by-name or epithet for Mercury remains almost impossible to explain, if it just meant, literally, 'speckled (like a trout)'. Lambert's suggestion is more promising in this context: one might quite credibly conceive of a "nourishing" deity. However, the *al-* of *albho,* with a meaning 'white, bright', would fit the bill perfectly, as Guyonvarc'h (885) recognises, since Mercury in a Celtic context was likely to stand for 'Lugus' whose name almost certainly means, likewise, 'brilliant-white, shining-bright'.[26] It is also worth noting that a name with this root, extended as suggested in *-aw-*, might - unlike the participle suggestions of Hamp and Lambert - contain the *-no-* suffix that we have seen to be quite typical of divine names such as 'Albio-n' (a name we have suggested might be parallel, to some degree, with 'Alauna').

It is true, though, that a derivation from *al-*, 'bright, white' would seem to contradict the suggestions above, that the primary association of the *al-* of 'Alauna' was with water. However we have also suggested, above, that in the case of the *al-* of *albho* (as with *albho* itself) the meaning 'bright, white' was secondary to a divine name function, or a meaning 'divine'. In this context it becomes quite feasible to reconcile an association with both celestial-brightness and water because the two might well go together in a context of ancient religion. Both might quite credibly represent manifestations of that primary divine name function that we have suggested for our root *al-*, in *albho*. It is important that for the latter root *albho*, itself, we have already noted, above, this kind of duality of semantic association: not only a meaning 'white', but also – in some Germanic languages – a secondary meaning, 'watercourse', derived from its use in river-names (or for river-deities). As we have suggested above, it is not too hard to imagine this kind of process going further (for a root with a longer history as a river/divine name) to produce an even more generalised meaning 'water': such as Ifor Williams saw in Welsh *al-*.

This connotation of 'the divine', meanwhile, might also, represent another perspective in which to see the fish names, and associate even those of them that are not white with our root *al-*, on the assumption that they had some mythological connection

[26] For the relative frequency of divine names with this connotation (over "nourishing, one who nurses", or the like) in a Celtic conext: O'Rahilly passim.

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with, or were regarded as a manifestation of, 'the divine' (or a deity in *Al-*). One might think of the divine aspects of the 'Salmon of Ess Ruaid', as described by O'Rahilly (319-20). Guyonvarc'h (1968), meanwhile, suggests that *alauda* as the Gaulish name of the skylark owes its origin to some mythological association of the heavenward-ascending singer-in-the-skies, as seems to be the case with the later (unrelated) Breton name for the bird: *alc'houeder* - related to *alc'houez*, "porte-clefs" - as appropriate to the bird which opens the gate of the sky to the souls of the dead. Alauda would be from *al-awa- (idio)* and so at least potentially closely related to *Al-awa-no* (> Alauna), like *alausa* the fish-name and *alaw* the (river and) plant-name. The skylark is certainly not white or shiny, or particularly associated with water, but we might still allow some connection with our root *al-*, on the basis of the primary 'divine' (and so heavenly-celestial ?) associations of that root.

It is worth bearing in mind, in this context, that the name, 'Alauna', was by no means only associated with rivers. Although it appears mainly as a river name in Britain it features primarily as a settlement name on the continent and these do not all seem to be derivative of a hydronym[27] though they are, along with the tribal name, likely to be associated with the divine name (certainly in one case: Guyonvarc'h 1972: 868). Even in Britain Ekwall (7) notes that Penally (anciently 'Pennalun') in Wales (compare 'Penhallan' in Cornwall), which is most simply explained as a derivative of 'Alauna', was probably appropriate to a headland. Ekwall suggests that in these names the 'alun/allan' must have a different meaning to the 'Alun' (from Alauna) in river names but that is not necessary if the divine name function was primary: both could be named after a god (and a headland quite feasibly after a water-associated god, but see further V, below).

That the root *al-*, itself, as found so commonly in toponyms, had theonymic value might be further supported by the record of an apparently Celtic god from Northern Italy, 'Alus' (Holder I, 110, III, 579). There may well have been a complex history of interaction between divine and river (settlement, people or even fish/bird) names that resulted in the latterly dominant form 'Alauna', perhaps along the lines that we suggested for the

[27] Guyonvarc'h suggests possibly one (872), whilst in another case "l'hydronome est issue du toponyme"(873).

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evolution of Albion from Alb-. Thus Al > Al-awa > Alawa-no > Alauna, parallel to Alb > Alb-io > Albio-no > Albion (see I, above). Of course it is possible to argue that Alauna had none of the connections with fish, bird and other river names that we have suggested it did but as a common and dominant toponym and theonym it is inherently likely that it did have the kind of broad resonance in Celtic culture that these kind of associations would imply it did. Its commonness was no doubt a factor of its associations with other toponyms in *al-*: it may well be that it spread via the assimilation of other toponyms (/theonyms) in *al-* to this 'fashionable', dominant, form. The explanation for the apparently disproportionate incidence of Alauna as a river name in Britain, for instance, might be that there was a common pre-existent river (and deity) name in Al- (related to Ifor Williams' *al*, 'water' ?) that tended frequently to be reinterpreted as 'Alauna' (as introduced by a dominant new wave of Celts from the Continent ??)

Whilst we have identified the *al-* of 'Alauna' with the Indo-European *al-* in *albho* we have also suggested the likelihood that this root will have tended to merge with similar-sounding pre-Indo-European ones in a theo-toponymic context. This is given, for instance, the typical tendency for deities to be identified one with another, particularly in the context of the mixing (by conquest ?) of peoples that must have occurred to allow the Indo-European languages to spread. This might allow at least the base root, *al*, of 'Alauna' some kind of ultimate pre-Indo-European heritage that would go some way towards justifying Rostaing and Dauzat's view that it contained a pre-Indo-European root. It may even be possible, for instance, that the prevalence of names in 'Al-' rather than 'Alb-' amongst the (non-Ligurian-influenced) Celts had to do with some strong substrate tradition amongst the early Celts. In fact, given that any divine name might be very likely to have the associations with white/brightness and with water that we have attributed to the *al-* in Alauna we cannot be certain, in the final analysis, that our in *al-* in *albho* was actually involved at all. Although we have argued that that is very likely, its ultimate origin might lie in some other root *al-*, either Indo-European or pre-Indo-European. But in any case the divine name function of the root will have been longstanding so that, together with the association with brightness and with water that typically accompany that function, it will have overshadowed any other

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semantic value that originally the root might have had, by the time of our sources for it. The only thing that will really be essential for our argument, in fact, (as advanced in V, below) is that the *al-* in 'Alauna' had the kind of associations that made it readily assimilable to, and equatable with, the *al-* in *albho*.

Next we come to 'Alesia'. 'Alesia', or 'Alisia', as the name appropriate to a settlement on a rocky outcrop, is very plausibly derived from **alis* from Indo-European **pals-o* (see, e.g. Vendryes 1959: A-29-30) a Celtic equivalent to the German word that gave French *falaise*, a rock-cliff. [28] However associated with any word **alis*, 'cliff', would seem likely to be the names for the alder and service tree, based on *aliso* (that we have discussed above). The *alisier,* or 'service tree', is says Dauzat (1978: 5), on the basis of it typical habitat, "sans doute arbre de la falaise" . Howeve it is scarcely possible to derive the tree name simply from Celtic **alis,* 'cliff', given the wide distribution of the tree names, based on *aliso*, in Baltic, Slavic, Germanic and Italic, and certainly not given our suspicion that it belongs to the pre-Indo-European substrate. As we have seen the tree-name has also been linked to *al-* , meaning 'white' (Whatmough 178 : pp. 543-4; Bertoldi 1930)[29] . A further connection seems likely – again on the basis of typical habitat - with a widespread hydronym *alis-a/one* (Bertoldi 1927; Dauzat 1978: 18 19). One might also link the place-name with this, especially on the basis that both are likely to contain, or bear some relatinship to, the theonym, 'Alisonus'. The hydronym would seem to contain *al-* plus a suffix *–is* (on the basis of a comparison with the 'Arize' from *ar-is*) and Rostaing and Dauzat would identify this *al-* as an ancient pre-Indo-European root. All this might suggest that we have to do with the interaction of Indo-European with substrate languages here and the complex pattern of associations might seem to require some ultimate point of common reference somewhere deeply implanted in the latter. This we would

[28] Alternatively, **(p)alis* < pre-Indo-European *pal* (so Dauzat 1978: 8, cf. 185-8: contra Vendryes and Hubschmid 1960: 17).

[29] In this context it is significant that, as Whatmough observes, Alesia was, in the Middle Ages, popularly connected with *'alisum'* for unleavened bread; a word he implies might have to do with *alica*, 'spelt, spelt grits', another word that Bertoldi thought contained *al-*, 'white'. Whilst we might have simply popular etymology this kind of thing might seem, on the whole more likely if there was, indeed, some connection between the *al-* of Alisa, and the *al-* of *alisum, alica*.

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take to be a pre-Indo-European theo/toponym in *Al-*, such as we have already suspected in other contexts and which might also lie, ultimately, behind Alauna (as Rostaing and Dauzat thought). This may very well have become assimilated in the context of Alesia to a Celtic **alis* from **pals-o*.

The applicability of our pre-Indo-European root to both hydronyms and oronyms is quite feasible on the basis that it was primarily a theonym: but one can think, anyway, of the various mountain names mainly from the 'Mediterranean' regions of France, that are included under a pre-Indo-European root *al-* by Rostaing and Dauzat (1978: 104-5; cf. Flutre 122, note 1) and which might demonstrate that an ancient root *al-* was quite typically used of oronyms. We have also suggested, above, that toponyms in *alb-* represent, for the most part the assimilation of an ancient root *al-* to Indo-European *albho*: these toponyms in *alb-* are predominantly mountain-names (or island-names, like Albion for Britain, which would be closely associated with them). It might be that assimilation of our ancient (predominantly) oronymic root *al-* to a Celtic *alis*, (from **pals-o*) accounts for the final form (in *-is*) of our name (Alisia/Alesia), but we might also (or otherwise) have a (further ?) assimilation to *aliso*, the tree-name, which might, itself, represent another derivative of a pre-Indo-European *al-* as typically applied to 'oronyms, mountains, rocky terrain': on the basis, perhaps, of typical habitat (or, say, the tree envisaged as a manifestation of the spirit/deity of the hill/mountain/earth on which it grew). This kind of assimilation, of course, might have been a factor in the survival of the ancient root in this toponym. Vendryes (A-29-30), meanwhile, links the hypothesised Celtic *alis* with Irish *ail*, also *all*, 'a rock' but we might equally derive this from pre-Indo-European *al-*, or, again, suggest that the latter has fallen in with the Celtic word: perhaps imparting to it theonymic associations in certain contexts. This might have been a factor in the assimilation of *ail*, 'a rock', to 'Ailbe', that we have observed, above (in Part I).

We can move on, next, to the evidence provided for Celtic deities and mythology by early Irish literature. In this context a name borne by several important figures is 'Ailill', related to 'Aillén', a name for the sun-god (O'Rahilly: 279, also 72, 328), and probably also related to Welsh *ellyl* (Irish *ail-* and Welsh *ell-* probably both

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from original *all-*), [30] which is the Celtic word with the closest meaning to Germanic 'elf'. These words might be explained as derivative of a Celtic *al-* (related to Latin *ul-ter, al-ius*, etc....), 'other', (GPC 1209: ellyll; 176: arall; Pokorny 24-6) but the coincidence in meaning with Germanic *alb-* (< 'elf') is very striking as is the association of not only 'Aillén', but also several figures named 'Ailill', with the sun-god.[31] We might have a very good case, here, for seeing the *al-* of *albho* (of divine and solar-bright connotations) as the root in these names.

At the same time it seems unlikely to be a coincidence that a second St Ailbe (after the one of Emly) was associated with the Ui Ailello of Connaught (Tirechan's *Vita Patricii* 19.5; Bieler: 138-9)[32] , named after their leading ancestor-figure – that is, no doubt, patron deity - 'Ailill'. We seem to have here an example of our typical assimilation of *al-* to *albho-* : here in a context of the Christianisation of pagan cults (one might compare Bertoldi's Romance equivalents in *Alb-* and *Al-*). One can note further that appropriate to the Munster of the most famous Ailbe was an important ancestor-figure Ailill 'Aulomm' ("bare-ear"), so that

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[30] O'Rahilly: 300, note 3; *GPC* 1209, *ellyll*. To this word cf. *el*, as recorded in William Owen's Welsh Dictionary of 1795: "what has in itself the power of motion, a moving principle; an intelligence; a spirit; an angel"

[31] In the *Acallam na Senórach* (Dooley: 51-4) an 'Aillén' emerges from a *síd* every Samain to burn Tara with his fiery breath. The most famous Ailill is 'Ailill mac Mata', husband of Medb, Queen of Connacht, but originally sovereign-goddess of Tara (so O'Rahilly: 176): a union of earth/mother goddess representing 'the land' with a deity representing the upper solar/celestial world might be typical. The second name, or epithet, of Ailill Áine, ancestor deity of the Laigin (O'Rahilly: 102) or originally Erainn, suggests his solar affinities (O'Rahilly: 288-9 : *an* = fiery, *aine* = fieriness, 286-7), while the same association is seen in the partnership of Ailill Aulomm, ancestor deity of the Munster Eoganacht (O'Rahilly: 184 : but similarly taken over from the Erainn, 289) with his wife 'Áine of Cnoc Áine' (O'Rahilly: 289). One can compare the Aillén of the 'Tuatha Dé Danaan' who has a sister, 'Áine' (in *Acallam na Senórach*).

[32] See also O'Hanlon: I, 515-6 and *The Martyrology of Tallaght* (Best/Lawlor 1929), January 30th: "Cruimthir Ailbhe". Note that also associated with 'Seanchu', Shancoe, is a saint 'Alten' (< 'Eltene'): O'Hanlon: I,176; "Alteni" in *Mart. Tall.* January 11th. This might represent another adaptation of our theonym in *Al-*, this time perhaps by assimilation to the Indo-European root *alt-*, 'high' in e.g. Latin *altus*; cf. Brittonic 'Alt Clut' (*Annales Cambriae* s.a. 870) for Gaelic 'Ail Cluaide', Dumbarton Rock. This saint might also be associated with the local tribal name: 'Altraige'.

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associations with an earlier divine name in Ailill, from Al-, are not lacking in that context, either.

A root *Al-* features in other names of mythological import such as the 'Alloid', father of Manannan in some sources (see, e.g., Vendryes 19:) or in toponyms with important 'tribal' and therefore mythological associations, such as Ailech (centre for the Northern Ui Niall in Derry) or Ailenn (one-time centre for the Laigin of Leinster). We suggested, above, that our *al-* from *albho* typically merged with a substrate homonym, and that may be the case here, especially with the toponyms: which might have the kind of ultimate substrate origin we suggested for 'Alesia'. In any case some kind of association of Ailenn with Ailbe might be infered from the fact that the hound 'Ailbe' (of Mac Dá Thó, see I, note 21, above) defends Leinster, the ancient religious centre of which was 'Ailenn', while the *Metrical Dindschenchas* (Gwynn:) describe the female eponym of Ailenn as the owner of a marvellous lap-dog (a kind of effete equivalent to the hound) called Ailbe.

Meanwhile, behind the 'Inbher Ailbine' (Tirechan 5.2; Bieler: 127), as well as the 'spring of Ailbe' that is associated with 'Ailbe Gruadbrec' (*Acallam*, Dooley: 209), may stand a hydronym in *al-*, that is related to Al-auna. On the other hand the Inbher Ailbhine may contain *ail*, 'a rock' (Watson: 469, note 1), which word may also have become assimilated to 'Ailbe' in the 'Sliabh Ailbe' (in *Duanaire Finn* in MacNeill/Murphy: II, 95, xlii) that is associated with another legendary Ailbhe. But as we have suggested above Irish *ail*, otherwise *al*, 'a rock' may bear some relationship to our pre-IndoEuropean theo/topo-nym, *Al-* : that we have also suspected may figure in our Irish toponyms. The hound Ailbe, who defends Leinster (and so Ailenn), was associated with not only a 'plain' but also a 'stone' of Ailbe (the 'Mag' and 'Lia' Ailbe, see I, note 21, above). Also relevant here might be the "marvellous stone altar" (= prominent rock with religious associations ?) "on the mountain of the Ui Ailello" where Patrick was said to have installed St Ailbe (probably the old site of the church of Shancoe, County Sligo, where a large rock overlooks a well: MacNeill: 608)[33]. The implication might be that Ailbe (in his 'Christian-saintly' or other manifestations) became assimilated to *Al* as a theonym closely

[33] As well as, perhaps, the nearby church and well of 'Ail Find' (now 'Elphin'): literally 'white rock' but perhaps 'rock [by the] clear-white [spring]' (Tirechan's *Vita Patricii* 5.7, 22.1.23; Bieler: 127, 140-1).

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linked to toponyms, oronyms and to *ail/all*, 'a rock': and therefore with the the pagan-religious associations of rocks and standing stones, in general.

In a Germanic context there is a host of divine names in *al-*,[34] Especially common is the initial element of compounds, *al-*, from *all* meaning 'all' or 'great' . This is related to Irish *oll*, 'great'[35] , and old Latin *ollus*, whence *ille*, 'that one' (Lehman 29; Ramat: 31-4) and would seem, therefore, to derive from a root *ol-*. Pokorny (24-6) placed Germanic *all*, together with Latin and Celtic *oll-*, in a credible semantic relationship with other words, like Latin *alios*, 'other' and the Celtic tribal name, 'Allobroges', that would seem to imply (so Schrijver 1991: 40, no. 21; 66, no. 6) a root *al-* as the 'full grade' formed from a root with an a-colouring laryngeal: *h2el-*. This suggests that the *ol-* , from which Germanic *all*, 'all' (together with Irish *oll* etc..) derives, is a closely related form, namely one from *h2ol*, as the 'deflected' grade of an original *h2el* (so, e.g., Schrijver 1991: 51, no. 2). The sense of 'beyond, other' that Pokorny gives as fundemental to his category might quite feasibly be something that was originally associated with, or derived from, 'the divine'. So, on a theoretical level at least, this group could be related to the *al-* (or *h2el-*) in *albho*, on the basis that the meaning 'white, bright', of the latter, was derivative of a meaning 'divine', 'divinely associated'. This would be consistent with the fact that one can trace 'divine associations' back to the original *h2elbho* that underlies both the zero-grade *h2lbho* of Vedic 'Rbhu' and the full grade form behind the Western Indo-European forms (for 'elf' as well as words for 'white', 'swan' etc..).

In fact there are other roots in *al-* in Germanic and other Indo-European languages, that have important religious, or potentially religious, connotations, and so which might conceivably derive from a primary meaning 'divine, divine associated'. There is the *al-* in the (suffixed form?) *alc-*, for instance, that probably

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[34] Especially in 'matron' names : 'Alaisiagae' (Birley: 110, 157); 'Alateiuia', 'Alaferhuiae', 'Alagabiae', 'Almauiahenae'; 'Alateru(I)ae' : see Whatmough § 223; De Vries § 524, 540, 541; Pokorny: 25; Simek: 5-10.

[35] So Lehman and Ramat, though Vendryes 1959: concluded "rien de sur". As Pokorny: 25 notes the epithet of the Dagda, *oll-athair*, 'great father' is equivalent to that of Odin, *al-fo□r* : see De Vries 1970§ 398, note 5; 1977: 6. This is the root in 'Ol-cu', 'Great Hound', the name of St. Ailbe's father.

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figures in the Germanic divine name 'Alcis', appropriate to the divine twins recorded by Tacitus, as well as in Greek , -, , 'to ward off', and Sanskrit *ráksati*, 'to protect' (Lehman 27; Pokorny 32; Chantraine 57-8). The basic meaning of the word would seem to be 'to protect' but this would seem to be protection in a strongly religious context since derivatives like Old English *ealh* and Old high German *alah* mean 'temple' whilst Lithuanian *alkas* means 'holy grove', (from 'place on hill where sacrifices were made') and Latvian *èlka kaln*s means 'temple hill'. The root also appears in many place names. If the religious, divine, aspects of the root were actually primary (the sense of 'protect' derived from the typical function of a divinity) then that might allow some kind of relationship with our *al-* from *albho*.

Then there is the root that appears in the Germanic charm word *alu*, probably related to Hittite *alwanzu*, 'afflicted by sorcery' as well as Germanic words for 'ale, beer', and which seems to have a basic meaning that relates to a special state of mind induced by a deity (De Vries 1970: § 264; 1977: 7; Simek: 11-12; Polomé 1995). Another relevant root might be *al-*, 'to nourish, nurse' (understoood as a characteristic function of a deity), which is found in Greek, Latin and Irish, though probably not Sanskrit (Lehman: 25). As we have seen Lambert has suggested that it was this root that figured in 'Alauna', while Lehman (25) actually suggests that it may ultimately be the same root as in *alk-:* understood as from *al-k-*, a suffixed version of *al-*. One might see *al-u-* as sharing ultimately the same root with a different suffix, and *al-bho-* as showing a different suffix again. We might then be able to at least raise the possibility that all (or some of) these forms share ultimately the same root[36] : on the basis that that ultimate shared root, *al-*, had to do primarily with the divine, or was actually a divine name.

Taking a different approach, another question we might like to raise is whether the frequency of Germanic divine names in *al-* (especially *al-* from *all*) has anything to do with the assimilation to this element of an earlier strata of divine names in Pre-Indo-European *al-*. One Germanic divine name that has not succumbed to

[36] We might even include the *al-*, 'to burn' (Pokorny 28) that Marstrander saw in Irish *alad*, 'speckled' and related fish names: on the basis that, like 'bright, white' it might be a quality associated with a solar deity.

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any very convincing Indo-European etymology (De Vries 197: 641) is 'Váli', appropriate to Odin's son and avenger, of which 'Áli' seems to be a variant form. Another 'Áli' (otherwise 'Óli') was the mythical king of Denmark whose withering stare, which temporarily deters Starka□r, might seem suggestive of the scorching glare typical of a solar deity (Saxo Grammaticus VIII, l. 265 ff in Davidson 1979-80; Ynglinga Saga XII, XXV; Skjoldungasaga IX; Turville-Petre: 231). 'Áli', in this case, would be from 'Analo-', incorporating an Indo-European root *anu-*, 'ancestor', but we might speculate whether there might be influence from a similar sounding substrate form. That in turn might have something to do with the Áli variant of Váli. Váli is of disputed etymology but it has been suggested (De Vries 1977: 641) that it might derive from, for instance, the root in *wanum*, 'radiant' (*wan + lo > wanalo > wál*). On this basis, however, it is difficult to account for the variant form, Áli. If Váli represents, rather, a substrate form (perhaps with assimilation to the root of *wanum* parallel to our suggested assimilation of a substrate *al-* to *ál* from *analo,* whence Áli) then the relationship between Áli and Váli might be explained by some variation in a substrate form (with, say, the weakening and loss of the initial *v-* - a common enough development in the history of languages - in one of the variants)[37] .

Meanwhile Rostaing and Dauzat saw the pre-Indo-European root *al-* as very closely related to a likewise very common form in *ar-* (for "permutation entre l et r", Dauzat 1960: 74) so on this basis we might expect some kind of close relationship between our substrate divine names in *al-* and those in *ar-*. In this context it might be significant that another name for Áli (the king) was 'Armo□r' (Turville-Petre: 207), if that name, too, has been reached by assimilation from a substrate root (in *ar-*).

This might also be suspected in the case of 'Arvakr' and 'Alsvi□r', the names appropriate to the pair of horses that pull the sun, if we think of these names as deriving their raison d'être not only through 'appropriate' meaning but also via assimilation to some older name with solar-divine connotations. At any rate the fact that 'Alsvi□r' alternates with the variant 'Alsvinn' might

[37] The underlying substrate form might then bear some relationship to the name 'Vol-und' ("etymologie fehlt": De Vries 1977: 674) as appropriate to the 'Prince of ELVES ' (*aelfr* from *al-bho*, of course) who is also especially strongly connected with swans: *albh-iz* in Germanic.

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suggest that both are different interpretations of an original, the meaning of which had become obscure.[38] If that 'original' was a pre-indo-European theonym in *al-* (or similar) it may also stand behind *alfr*, 'elf' (from *albho-*) which would then represent a typical example of the assimilation of *al-* to *albho-*. At any rate while these beings have many solar associations (compatible with the root *albho*) they also have that sub-divine, 'faded', status that might make it seem likely that they are associated with an earlier stratum of deities

None of this, one might reasonably claim, advances us any further than the strictly hypothetical, but if only to demonstrate that the approach here is not completely arbitrary, it might be worth trying to better define the methodology at work. The basic idea is that, especially in a context of the oral transmission of popular tales over long periods of time, names that had become meaningless and obscure would tend to be replaced by similar sounding familiar ones or reinterpreted in terms of current vocabulary. On this basis we might attach some significance to the association in myth of names that are, formally, philologically unrelated, but nevertheless similar sounding, because they might represent associations that have their roots in the substrate. Our 'mythological' sources might then - uniquely - provide us with some clues about the former. This is an approach that we might, in fact, pursue more fruitfully in a Greek context .[39]

In Greece, first of all though, we can note that particularly suggestive as belonging to an earlier strata, like 'Alphito' (and perhaps comparable to our "Celtic" 'Alus'), is the ancient Arcadian goddess 'Alea', subsumed in 'Athene Alea'[40] ; while deities in 'Al-'

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[38] *Grimnismal* (in the *Poetic Edda*, in e.g. Larrington 1996) 37.1 with Arvakr = 'early awake' and Alsvi□r = 'very (all)-fast'; Sigrdifumal 15.3 and Snorri Sturulson's *Edda* 11 with Arvakr and Alsvinn = 'all-clever'. Note that the latter seems to be interchangable with 'Alviss' in the name of the 'Alviss-mal' (*Skaldskaparmal* 58, 63), see further below; while Alsvi□r was also the name of a giant.

[39] For the 'Aegean' or 'Mediterranean' substrate see Glotz: 1925: 386-7; Haley 1928; Davies 1986: 93-123. For the fragility of theories about a pre-Greek but Indo-European sub(or super-)strate see Hester 1964..

[40] Levi: I, 171, note 106; Pausanius II.17.7, III.5.6. VIII.23.1, VIII.23.1. Original eponym of the Arcadian city, 'Alea', with 'Aleus', the reputed founder, as derivative legendary figure. Greek , 'heat', of uncertain etymology (Chantraine:

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from the Middle East[41] might also be relevant given the likely Eastern associations of Ino/Leucothea [42] . Pursuing the approach outlined above, however, we can examine the wealth of 'mythological' data from Greece to look for reflections within it of our hypothesised *al(bh)-/ar-* relationship. This will bring us back, at last, to Dionysus and his relationship to names in Alph-. In this context we quoted the name Alpheios: the river deity of this name is most closely connected in myth with 'Ar-ethusa' (Pausanius V.7.1-3), another mythical figure and hydronym, and 'Ar-temis' (hence "Artemis Alpheia": Paus. VI.22). The etymology of Artemis is unknown but generally thought to derive from the pre-Indo-European substrate (Chantraine 116-7), which would suit her cult, of especially primitive type (Farnell 1977: II); she is also frequently associated with lakes, mountains, islands or associated toponyms [43] . Alpheios, Artemis and Arethusa, all three, were associated together at Arethusa's spring at Ortygia in Syracuse. On the basis of these associations, Dionysus, himself - who we might now see as likely to have become assimilated to deities not only in *alph-* but also in just *al-* - we might FURTHER associate with names in *ar-* (as related to those in *al-*). He was, of course, closely associated, actually in the context of Naxos, (whence our St Alban of Mainz) with 'Ar-iadne' ('very holy'), otherwise 'Ar-idela' ('very manifest')[44] , these two names being suggestive of alternative Greek

55-6), might be related but if so it has a meaning which might credibly derive from *al-* as a solar theonym.

[41] E.g. 1/ The 'Aala' of Hittite Asia Minor (Laroche 1946-7 : 28), a name not easily placeable in any linguistic category. 2/ The probably pre-Mitannian 'Alalu' (Laroche: 127). 3/ The Accadian 'Allatum', equivalent to the Sumerian chtonic mother-goddess 'Ereshkigal' (Von Soden: I, 37: "Al-la-tum', 'Grundbedeutung unklar"; Laroche: 120; Frazer, XXIX). Cf., perhaps, Akkadian *ilu* (*Chicago Assyrian Dictionary*, 89-105) and West Semitic *el* : 'a god', and the Syro-Arabian , equated with Dionysus by Herodotus (III, 8).

[42] She was the daughter of Cadmos, said to be from Phoenicia (e.g. Apollodorus III.1.1) and the mother of Melicertes, probably 'Melquart', the 'Phoenician Hercules'. She has a close equivalent at Rhodes under the name 'Halia' (Diodorus Siculus 5.55), with the appropriate meaning 'of the sea': but an early theonym in *al-* might very naturally be associated with, and therefore reinterpreted in terms of words for, 'the sea'. ' , 'of the sea' is from ' , 'salt', but the same element seems to appear in river-names.

[43] Pausanius II.7.6, 14.2, IV.31.3 VII.20.5, VIII.22.8, 53.3 and II.25.3, 28.2, VIII. 6.6, 13.1, 15.8, 23.4, X.37,1;Gimbutas: 198. There are at least nine Artemisium/a.

[44] According to Hesychius: = .

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interpretations of an original pre-Hellenic name (for a figure evidently representing an 'earth-goddess' of pre-Hellenic type: Farnell 1921: 48-9) in 'Ar(i-d-)-', perhaps related to 'Ar-t-emis', a goddess of originally similar type who, furthermore, figures in an early version of the myth (*Odyssey* XI, 21). Another cult especially associated with Naxos, we might further note, was that of the 'Al-oadae'[45] , while other paramours of Dionysus were Al-thea (Apollodorus I.8.1) and Al-exhirroe (Plutarch.attrib, *On Rivers* under 'Pactolius'). The suggestion, here, is that the mythical (from cult-) significance of these names might have originated via assimilation to an early theo/toponym in *al-*. The suggestion, overall, is that the observable associations in mythology reflect the degree of parallelism that we have theorised between Alpheios and Dionysus, as later-introduced theonyms that became associated with an earlier deity, or deities, with a name in *al-*, closely related to others in *ar-*. Those names would have belonged to the substrate, which is certainly much more visible in a Greek context, than the other ones we have looked at, surfacing relatively unambiguously in a name like Artemis.

Our theory would suggest, then, that 'Alpheios' very likely represents an adaptation or Indo-Europeanisation of an earlier pre-Indo-European name in just 'Al-'. At the source of the Alpheios there was (Paus. VIII. 44.3; Farnell 1977: III, 290) a temple to the , 'Mother of the Gods', (accompanied by a representation of lions, manifesting a tradition of the Mother Goddess that goes back to the sixth millenium in Anatolia). One might guess that the ancient Mother Goddess originally had some special association with the river, at the source of which her temple was located. This might be supported by the fact that along the banks of the Alpheios, to Elis, there was also a cult of the 'mother goddess', accompanied here by a "primitive cult of Hercules". Herakles is a figure who, by his very name, appears to have some special relationship with a famous goddess: Hera. This goddess in all probability repesents ultimately an archaic 'great' or 'mother' goddess (e.g. Gimbutas: 149-50, cf. Eliade: 277-8): the name if it represents a female version of ', 'hero', is a title that will have displaced an earlier name for such a goddess; otherwise it is an original pre-Hellenic name ("plausible"

[45] Pausanius IX.22.5 with Levi: note 118 on I, 356, Pindar, *Pythian Odes*IV 88-9; Apollodorus, I.7.4.

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according to Chantraine 415-16) for a 'great goddess'[46] . Whatever the ultimate origin of the figure (very likely in a historical individual, or at least events) Herakles may have come to represent to some degree (or incorporate) the secondary male element that was the characteristic complement to the great goddess: the Attis of Kybele, or the Adonis of Astarte/ Aphrodite.[47] This might have contributed to his dual nature as god as well as hero, to the stories about his journey to the Underworld, and to his ease of assimilability to non-Greek deities (e.g. Melqart: Farnell 1921: 166-72). Such a relationship with a 'great goddess' is especially likely to have been the case with "a primitive cult of Hercules" such as we have along the banks of the Alpheios. If the goddess, here was originally also the goddess of the river then she may originally have shared its name which, on our theory, will have been one in *al-* (before it was Indo-Europeanised in *alph-*). This goddess may also very credibly have been the original patron of the ancient riverside sanctuary at Olympia and there may be a trace of her cult there [48] .

Herakles was otherwise known as 'Alkaeus' (the name also of the father of his stepfather) and his descendants sometimes as 'Alkaids'. He was rivalled in archery by his companion 'Alkon' and he killed the giant 'Alkyoneus', who was also to some extent his equivalent, duplicating one of his feats, namely the stealing of the cattle of Erythea (Apollodorus I.6.1; Pindar, *Nemean Odes* IV. 27-30, *Isthmian*, 32-4). An 'Alkathous' also duplicated one of his feats

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[46] ' might conceivably have been derivative of in a culture where the godess was pre-eminent (so e.g. Gimbutas) and heroic qualities, or pre-eminent social rank, associated with her.

[47] Such a role, in subordination to the 'great goddess', is suggested, above all, by "Heracles the Daktyl": see Farnell 1921: 124-30. The "male element" seems to have had a mortal representative who characteristically suffered in his role (e.g. Frazer XXXVI) as devotee of the godess: which might have contributed to the legends that made Hera the persecutor of Herakles, although the goddess and/or her people may also, at some stage or in some sense, have been an enemy to incoming Greeks; alternatively for an opposition between archetypal hero and his 'parent', the primal earth-deity, who he 'kills', thus sundering earth from sky: O'Rahilly, p.15, note 2 in *Ériu* 16, 1952.

[48] . In the form of a cult of 'Eileithuia'(Paus. VI.20.2-6; Levi: 343, note 168) who may represent a specialised derivative of the 'Mother Goddess'. 'Eileithuia' was earlier 'Eleuthia': perhaps by assimilation of a pre-hellenic form (in *al-* ?) to , 'to come, to make come' (Chantraine 318): this meaning explaining the primary association with childbirth.

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(the killing of the lion of Cithaeron: Paus. 1.41. 4-5) whilst having an association with the city of 'Megara' that is, in a sense, matched by that of Herakles with his wife, 'Megara'. One might guess that in Hercules/Alkaeus what we have is two originally independent figures - one in Alk-, perhaps of Thebes, and the other associated with Hera and the Argolid - who have become identified together in certain contexts. However, Heracles's mother, Alkmene (associated with Thebes: *Iliad* XIX. 95) is less an equivalent, or potential equivalent, to Heracles but rather fills the role we might have expected to be filled (on the basis of the name Hera-cles) by Hera. Meanwhile, although one can readily understand why Heracles might attract a name in 'Alk-', 'strength', it is also possible that such a name might have had some influence on the character of the hero, with which we are so familiar. It is possible, then, that the root *alk-*, which we have seen, above, to have had religious associations in other Indo-European contexts was originally appropriate to a goddess (either as another name for Hera or for a closely equivalent ancient 'mother-goddess') so that the hero's name (Alkaeus) would have been 'secondary' to that of a goddess in exactly the same way that 'Herakles' is to 'Hera'[49] . However since we have suspected that in Elis a goddess associated with Herakles bore originally a name in (pre-Indo-European) *al-* then we might suspect that *alk-* repesents the adaptation or Indo-Europeanisation of that earlier pre-Indo-European name. It may be that the goddess-name in *al-* become one in *alk-* due to the appropriateness of the latter to a godess-associated hero (the name as appropriate to Herakles's mother will then have been re-modelled in line with that of the hero, himself) rather than, as we have suggested, under the influence of the (pan-Indo-European) religious associations of the root *alk-* . But in any case case we would have a goddess whose original pre-Indo-European name (in Elis and Thebes, at least) was one in *Al-*.[50] This will subsequently have become assimilated to

[49] Alkestis, another female figure in Alk-, associated with Herakles (Euripedes, *Alkestis*) is linked with the Underworld and so very credibly represents, ultimately, a goddess (of 'Kore/Persephone' or 'Inanna', type) like Alk-mene. The , too, as a mythical bird with religious associations (for the link between birds and the 'great goddes', Gimbutas: 112-50) may show the religious value of the same root *alk-* (but perhaps, again, reinterpreting an original *al-*).

[50] Plutarch (*Lysander* 28) described the 'memorial' of Alkmene at HALiartus as near the tomb of Rhadamanthus (whom she supposedly married), which, he says, was called 'Alea': bringing to mind the goddess 'Alea' with which we started our

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names in both *alk-* and *alph-*. The river/deity name Alpheios would represent an example of the second case and its relationship to our hypothesized pre-hellenic deity in *Al-* would, in a sense, be equivalent to that of St Ailbe to the Ailill of the Ui Ailello.

One might, finally, advance some kind of very provisional hypothesis in an attempt to bring together some of the threads of our study so far. We noted above the links of our hypothesised (pre-Indo-European) theonym in *Al-* with oronyms, rocky oronyms, rocks and their religious associations in neolithic religion. In that context we might note that Alkmene was worshipped in the form of a stone in a sacred grove at Thebes (though another legend had her dieing at Megara: Paus. I.4.1). Hermes was said to have taken her from her coffin and substituted this stone (Pherecydes in Aurelius Victor, *Transformations* 33; Paus IX.16.4) for her.[51] There is, in fact, plenty of evidence that might link the primal earth-mother goddess with mountains and rocks. Thus, Kybele, an archaic Anatolian goddess (of similar type to Artemis: Farnell 1977: II, 473; Eliade 279) was , the Goddess of Mountains, whose "centers of worship were most often located on mountains" and whose primary cult-representation was a black rock. In a Phrygian legend "Cybele and Agdestis came forth from rocks: the name Agdestis was a title of the great godess, being associated with a rock called Agdus near Pessinus, her religious capital" (Farnell 1977: III, 387; cf. Eliade: 147; in fact *agdus* meant 'rock' in Phrygian: Barnett 436). Ino, too (see above), was said to have emerged from a rock in Megarian tradition (Farnell 1921: 38). The Mother Goddess, sometimes under the name 'Rhea', was associated with rocks, caves[52] and mountains in Arcadia and Crete (Farnell 1977: II, 478, III, 290, 293, 298), from as far back as the Minoan era when she was depicted atop a mountain (Farnell: III, 296, Plate XXXIII; cf Eliade: 132) guarded by lions: the association of the 'Great Mother'

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survey of Greek deities and mythological figures. It is worth noting that Herakles does have a connection with that goddess: he married Auge, the priestess of Athene Alea, and daughter of 'Aleos' (Paus. VIII. 4.8-9; Farnell 1921: 135).

[51] The legend of Al-k-yoneus, meanwhile, was localised at a prominent rock (Graves 1955: 132, w, 7), whilst Al-k-athous was associated with one of the acropoli of Megara (the other was named after one 'Kar', while Alkathous killed his son, 'KALlipolis', Paus. I.39.4, 40.5, 42.1, 43.9: for *al* < *kal* and *kar/kal* see below).

[52] Eileithuia (above,note) had a famous sacred cave: *Odyssey* 19.188.

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with lions goes back to the 6/7th millennia at Catal Huyuk and Hacilar in Anatolia (Gimbutas 152; Eliade 46-7), and no doubt that with rocks and mountains does, too. The association of our ancient theo/oro-nym *Al-* with an ancient 'earth-mother' goddess[53] , then, might give us a credible Neolithic context in which the notion of 'deity' might have combined with those of rocks, mountains and the 'earth-in-general'.

Meanwhile we have suggested that substrate *al-* had a closely related form *ar-* . M.P. Fouché theorised that - in a 'substrate', or as he would have put it 'Paleo-European', context - non-Indo-European *ar-/al-* would be likely to derive by loss of an initial consonant from a primitive form (of the type consonant-vowel-consonant that is also the basic type in Indo-European) He specified as the most typical example, the well attested and widespread, pre-Indo-European root *kar(r)-*, with (actually probably primary) variant *kal-*, both with a basic meaning, 'rock, stone'[54]

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[53] Gimbutas (142, 196), suggested the pre-Indo-European 'Great Goddess' (especially of the Balkan/Aegean region) was not typically an 'earth-mother' but that might be a reflection of the kind of archaeological evidence on which her study is based, which by its very nature might not indicate the links of the deity with the toponymy (therefore 'the earth'): arguably a very characteristic feature of archaic religion: cf. Eliade: 147; Wagner: 7-8. .

[54] See Fouché 1939; following Alessio 1935. The element *kar/karr* is especially well attested as Pre-Indo-European: see, e.g. Agud 1989: IV; 183-4, Rivet : 501; Hubschmid 1953: 108-12, 1959 and also 1960: 23, 36-7 where he identifies it in Basque, insular Celtic, some Romance dialects (Spanish, Swiss and Italian), Slavic, Armenian, Georgian and South Caucasian, Chaldean, (whence also ?) Sumerian, and Berber. For *kar(r)* (borrowed) in(to) Indo-European, Alessio: X, 140, Hubschmid 1953: 110 and Pokorny: 531-2 : *Kar-*, 'hard' (but cf. Kitson: 99, note 50; Mann 534, 475; Chantraine 498-9, 475). For *Kar* as an ancient, pre-Indo-European river name, Tovar: 19-20, with map 7. Though Hubschmid's view of the substrate root *kar(r)-* is more narrowly circumscribed (see, e.g. Hubschmid 1963-5: II, 98-9), Fouché, Dauzat (1960: 81-102) and Rostaing (1950: 22-25, 117-27, 138-58) all associate *kar* with *kal* as does Flutre (57-60) who notes the inevitable "croisement" of substrate *kal-* with like-sounding Indo-European roots (such as, probably, **kel-*, to cover: hence various words in *kal-*, for rock-shelters, huts etc..). From substrate *kal-* are (arguably) modern French (< Cetic < substrate) *caillou*; 'a pebble'; 'Calpe', the ancient name for the rock of Gibraltar; 'Calabri' < 'Calabria'; 'Monte Celeg' (< **kel-ik-u)* in Provence (variant *kel*: Polomé 1987: 225) etc.. See Dauzat 1960: 98-9, for *kal* extending into Semitic (Arabic *qala*), into Caucasian, and into Lithuanian; and for *kal* in Indo-European (with the same meaning as *kar*) see Pokorny: 523-4, *kal-*, 'hard' (cf. Meillet: 87; Vendryes: C-25-6). Cf ., in general, Thornhill: 479-85, especially for *ar* < *kar* in 'theo-toponyms'. And see further note 56 .

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and found commonly in toponyms over a wide area. Thus *kar/kal* > *khar/khal* > *har/hal* > *ar/al*. Fouché gives many examples of a development along these lines mainly in a context of Pyrenean toponymy and it is important that this kind of sound-change has been credibly hypothesised for our one surviving 'pre-Indo-European' language 'Basque', in its early, 'pre-Aquitanian', stage (Fouché: 320; Trask 1997: 180-3, and further 128, 130, 157-63, 178-9, 331-2, 398-403; Martinet: 379-80): hence we have Basque *(h)arri*, 'a rock', alongside *karri* in substrate-derived Romance.

Arguably we have a roughly parallel development in Indo-European where our *al-* 'white', or 'divine, divine-asssociated' will have originated in a fom of typical consonant-vowel-consonant type with an extra initial, 'laryngeal', consonant: as we have suggested in this case, an a-colouring laryngeal, most often denoted *h2*. That will have been a velar fricative, according to Lindeman (1987: 40) and Lehman (108), a voiceless glottal fricative according to Bomhard (133) and a "pharyngeal", according to Beekes (148). We might have, then, an original form, say, *el-*. If that is the case then we might have the possibility, at least, of not only a roughly parallel development behind both our Indo-European and substrate *al-*, but also a common ultimate origin for the two since a form *el-* might quite conceivably go back to an original *Kal-*[55] (or a form that lies behind the substrate forms that emerge in our records as 'Kal-') by a process parallel to the *Kal*> *Khal* (> *hal* > *al*) that we have theorised yielded our substrate *al-*. The point of semantic convergence would be the name of a primitive 'earth-mother' deity (or of such deities in general). As we have seen that might be a credible Neolithic (or Paleolithic) context in which the notion of 'deity' might have combined with those of rocks, mountains and the 'earth-in-general'[56] . From the latter would

[55] We would also have to explain the vowel change but we suggested above that a dominant e vocalisation was likely to be a uniquely Indo-European development while Bomhard (1994: 73-83) does in fact derive *albho*, via *H2el-bho* fom **hal-/*hel* (i.e. with original ablaut e/a). For *albho* in a "Nostratic" context see Bomhard: 586, who relates it to, e.g., Hebrew *halal*, 'to shine' and Dravidian *alari*, 'beauty'; also Kaiser 1983: 386-7. In fact our ancient common original might be an open syllable *kl-*, rather than the *kal-* I have suggested: see Iverson 1992; Lakarra 1995; cf. Chadwick 1968: 94; Huld 1990.

[56] Cf. Thornhill 1999: 485, note 24. Clearly we need some theoretical explanation for the exceptional preservation or 'fossilisation', in so many languages (note 52), of forms like our *kal/kar* that must go back (in relatively unchanged form) to a

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come the root *kal* (/*kar*) 'a rock' and the associated oronyms (and ultimately other toponyms), including those in a typical derivative, *al-*. Meanwhile the divine name, by application to that most popular symbol of divinity - the sun - would also come to have a meaning, 'bright, white'. That the concept of 'divinity' also became associated with that of the sun, sky and light/whiteness is something else readily believable in a later Neolithic and Bronze Age context. It is important, though, that the 'earth-mother' concept is almost certainly the more archaic, being traceable in one form or another, back to the Paleolithic, so that we are likely to have an evolution, or trend, in the direction of rock/mountain associated 'earth-mother' to solar, or sky, deity. Hence the meaning, 'bright, white' would most typically have been associated with our later, characteristic, derivatives of *kal/kar* in *al* and *ar* [57] (although we might expect, also, to find some cases of that meaning, associated with original *kal/kar*). Meanwhile *al/ar* formed from other primitive roots by a parallel process involving the loss of other consonants (cf. Fouché: 314), might often have fallen in with *ar/al* < *kar/kal* and acquired the same semantic connotations[58]

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very early strata indeed, where these languages 'converge' in a common original. We would suggest this has something to do with the commoness of the form in onomastic contexts (note the meaning 'rock' might readily be preserved in, or perhaps rather 'serially suggested' by, toponyms) where it might typically have outlasted linguistic succession and so would have resisted linguistic change (outlasting linguistic succession it would be subject to cross-language assimilation: cf. my notes 9, 15, 22, 29, 30; Thornhill: 480-3, etc..; in a group of related languages the elements in common would tend to be the most archaic, so that cross-language assimilation might tend to preserve an ancient form). The commoness in onomastic contexts might, in turn, have been a factor of the cultural importance of the 'earth-mother deity'. If it is true that such names (especially theonyms) were perpetuated to an exceptional degree then it would not be surprising that, over time, they would have an exceptional influence on the rest of the (more ephemeral) lexicon: i.e. that many words would trace back, ultimately, to a theonym, in the way that we have suggested.Of couse *kal* (or *kl*) might have been simply the most common of many theo-toponyms - ultimately names-of-the-mother-goddess - that all tended to be perpetuated on the same basis.

[57] Cf. perhaps, for instance, the root *are(e)-g*, 'shiny, white' in Indo-European.

[58] The variant to 'Alpes'(Whatmough 1931: 144-5) might possibly represent the influence of such a root: the *sal-* would represent the original form (existing as an 'archaic' variant) of an *al-*, that had been assimilated to Indo-European *albho*, but was then subject to resurgent substrate influence accounting for the *bh* > *p* (cf., above, note 15) as well as the initial *s*. Alternatively the *sal-* might even represent

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Many of these forms will then have become assimilated to the Indo-European suffixed form, *al-bho-*.

Relevant here, of course, would be the solar associations of Germanic 'elves', Indian 'Rbhus',[59] and even swans and other creatures as denoted by *albh-* or *al-* or even *el-/ol-* words[60] . Even if the latter represent a proto-Indo-European root with a different initial laryngeal it is still possible, of course, to posit a common original at the pre-Proto-Indo-European stage: and to further suggest that this would, in fact, be our hypothetical *kal* (or similar), of 'divine', 'earth-mother', associations. Also relevant here, meanwhile, would be the fact that solar deities were typically associated with fertility and vegetation - like the gods that were assimilated to Dionysus. The fact that elves and Rbhus are only semi-divine may have to do with the earlier Indo-European attitude to the solar deities of fertility and agriculture, of the peoples they came to dominate (subordinate to their own fully divine *dyaws-pater* ?). Relevant also would be the association of elves (and related beings like dwarves) with, on the one hand, the sun (world of light), and on the other with rocks, stones, the earth in general (subterranean world of the dark). The fact that *al* and *alb* are, or were, appropriate to a large number of river, or more pertinently, 'mountain' and related 'island' names, would have to do with the ultimate origin of these in *kar/kal*, as a widespread (theo-)oronym.

Much of this is very speculative, necessarily provisional and presents problems in need of much fuller investigation than we can give them here but it might be helpful to at least bear in mind that

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an original *kal-* that had undergone a sound change comparable to the one typical of the satem languages of Indo-European.

[59] See I, above. Rbhus are "of sunlike appearance" and associated with the solar deity, 'Savitr' (Macdonell: 32-4), for whom they act as agents of fertility (133). See also Haudry and above, I, note 34.

[60] For swans, Green 1991: 23, 70-1, 73, 112. The connection between some of the creatures listed by Pokorny: 302-4 (my note 3) with a root *el/al* might have as much to do with 'solar-divine' attributes as any to do with colour: cf., e.g, the deer/stag names in *el* (including Greek > 'Elafius') with the pronounced solar affinities of that animal: the antlers being seen as a model for the sun's rays etc, see Green: 23-4, 26-8, 54-5, 59-60, 66, 69-70, 78, 80-4, 100-1, 125. Arguably, it is a typical problem that semantics are interpreted on the basis of a contemporary (literal and rational) mind-set rather than an early, Neolithic, religious/ magical/ mythological one (cf., e.g., J.U. Hubschmied, *Revue Internationale d'Onomastique* 7, 1955, pp. 171 ff).

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wider context to which our 'Alb-' cult-figures, and the earliest name for Britain, might ultimately belong. It is one that allows us to at least speculate that behind 'Albion' lies a pre-Indo-European solar theonym in *Al* (even perhaps ultimately an Earth-Mother-deity in *Kal*) that we might plausibly associate with the Wessex culture and the builders of Stonehenge. Associated with this it also offers a theoretical explanation for the many forms in *El-* rather than *Elv-* that we have associated with the British St Alban, since our form derivative of *Alb-* might easily have become confused or conflated with related forms derivative of *Al-*. It may well be that, as a theonym in general, in an insular context, the latter had greater currency: we have noted, for instance, the absence of the root *albho-*, 'white', in Celtic, suspecting the Gaulish examples to derive from Ligurian

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ABBREVIATIONS

***JIES** : Journal of IndoEuropean Studies; **ZCP** : Zeitschrift für Celtische Philologie; **BZN**: Beitrage zur Namenforschung.*

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Essays on Germanic Religion

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Emotional Symptoms of Neurological Disorders in Children

Ralph Scott
University of Northern Iowa

Research increasingly demonstrates the central role of emotions in neurological or biophysical disorders. Is there any doubt within the scientific community that environmental experiences can change biology – as biology is broadly defined to include the impact of genetics, neurotransmitters, brain structure and function – and that biology can impact behavior? Regrettably, however, in daily delivery of psychological and educational services the interplay of neurological and emotional dynamics often leads to misdiagnosis, then to inappropriate interventions, and eventually to less tangible benefits.

There is ample reason to believe that contemporary psychologists often inappropriately attribute children's adjustment and developmental difficulties primarily to cognitive and emotional factors, and give short shrift to neurological considerations.In this article I wish to focus on five issues and anticipate later discussion concerning these complex matters. First, several case vignettes are reviewed, using masked data: these brief case studies illustrate possible consequences of intervention strategies which solely rely on environmental and curricular intervention and ignore neurological considerations. I then link the two vignettes to epidemiological evidence that the incidence of children's neurological disorders is far higher then generally recognized. Bandura's self-efficacy model is reviewed with respect to the interplay of neurological, cognitive and emotional symptoms. Next I discuss various levels at which neurological factors can impact on emotional symptoms children present and how standardized tests, both aptitude and achievement, constitute some – and I emphasize some – of the most trustworthy and useful assessment arrows in the psychologist's diagnostic quiver for facilitating appropriate matches between a child's abilities, motivations and assigned tasks. Fifth and finally, current opposition to the use of aptitude and other standardized measures is examined in the context of the current drive to mainstream students, and a perplexing question arises: do psychologists and educators shoot themselves in the foot and create obstacles to modulating the impact of neurological disorders by uncritically supporting reform movements aimed at ignoring evidence of human diversity and reducing or even

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eliminating neuropsychological, projective and, more generally, standardized aptitude and achievement tests?

Probably all of us can recall individual children with whom we have worked and for whom in retrospect we might have facilitated greater self confidence and success, had appropriate attention been given to the interaction of neurological and emotional factors. Not all those memories stem from clinical experience. I vividly recall memories of problems endured by Kenny, a high school classmate in my Wisconsin hometown; he seemed hopelessly incapable of learning. Confused in all academic areas and inclined to prematurely and disruptively cease problem solving, Kenny possessed little self esteem, was noticeably anxious when called upon to recite in class, anticipated failures, bullied classmates, and constructed a self-isolating wall to protect himself from embarrassment. I cannot recall a single classroom incident in which Kenny experienced an opportunity to demonstrate his advanced artistic and visual spatial skills.

Only in recent years did I learn that Kenny's schooling and emotional difficulties were very probably attributable to two primary neurological factors which had gone undetected. First and representing nomothetic considerations, Kenny was left handed and possessed greater competence in right hemispheric than those left hemispheric tasks upon which curricular success is largely dependent. Second, there were ideographic factors: a blue baby at birth, Kenny's early oxygen deprivation probably restricted acquisition of certain language skills which are highly correlated with academic success. The fact that Kenny eventually became a successful businessman, exercising acute skills in visualizing how and where future Wisconsin campsites could be constructed, suggests that he was eventually and independently capable of overcoming hurdles unwittingly erected by well intentioned educators who inordinately focused on standard curricular and largely left hemispheric objectives, while ignoring evidence of markedly stronger right hemispheric skills which have the potential to enable many students to become happy and productive adults.

Learning obstacles experienced by another child, let's call him Bill, also illustrate the interplay between emotions and neurological considerations. Referred to me while in fourth grade, Bill struggled in reading, spelling and to a lesser extent in math. Until Bill was referred to me, no school representatives had interviewed his parents.

From Bill's parents and former teachers I learned that Bill had been frustrated and discouraged academically since – but not before – mid-kindergarten. Resource room assistance was first provided in

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fourth grade, with little impact; school personnel quickly assented to my suggestions for comprehensive assessment, including a parental interview. Administration of a Wechsler aptitude measure yielded a 33-point verbal-performance split and marked impairments on the Verbal Comprehension and Freedom From Distractibility Indices. Standardized achievement evaluation also revealed wide scatter; in some curricular areas Bill performed far more competently than in others.

Certain demographics suggested the improbability of environmental explanations for Bill's learning and behavioral disorders. There was no evidence of familial learning deficits or detrimental ordinal dynamics, and Bill's four siblings were excellent students. Further, the parents reported that Bill passed the developmental milestones within normal limits until, when he was five years old, the family farm was struck by raging winds. Seeking to drive chickens back into their shed, the father hurled shingles torn from the roof of the farmhouse toward the chickens. One shingle went amiss and struck Bill in the head, rendering him briefly unconscious. After this incident, teachers reported that Bill was distractible, had trouble focusing, was seldom enthused about learning, and was fearful and anxious upon encountering even mild frustrations. Assessment examined interaction of emotional and neurological factors and psychodiagnostic data were translated into appropriate curricular strategies; school-based efforts were coordinated with parental expectations and follow-up interviews revealed significant reductions in Bill's anxiety, depression, and proclivity to socially withdraw.

Well controlled studies reveal that problems such as those of Kenny and Bill are not rare: thousands of children, as well as their families and school personnel, have paid a high price when biophysical and emotional considerations are not integrated into diagnosis and interventions. Consider what we know of only one category of neurological impairment: Attention Deficit Hyperactivity Disorder (ADHD), which has a long history marked by numerous descriptive rubrics such as brain injury and minimal brain dysfunction. ADHD children presumably comprise 3 to 5% of the school age population. Moreover, numerous ADHD youngsters also present learning disabilities and concurrence rates are widely believed to constitute 9 to 11% of school children.

Whether ADHD leads to LD or vice versa, considerable research indicates that – often because of neurological complications which include genetic proclivities – ADHD and LD children present greater

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intra-child cognitive variability, which if not diagnosed and treated can impede formulation and implementation of appropriate strategies and thus exacerbate dynamics which contribute to low self confidence or, employing a term that has gained recent coinage, self efficacy.

Albert Bandura, whose investigations have created new understandings into biophysical and emotional linkages, proposes that efficacy or positive expectations flow from a series of interrelated actions. First, when a task is performed well, efficacy expectations increase and the threat of failure subsides. This is likely to facilitate sustained effort on later tasks. Psychological arousal is more manageable if tasks are seen as attainable, and if so anxiety declines. Moderate anxiety then facilitates positive feedback, which adds to later efficacy expectations. But – and this is important – information the person receives enhances self efficacy *only* if seen as reflective of a person's abilities. When individuals consider external factors responsible for success, self efficacy declines. Not surprisingly, longitudinal data indicate that self efficacy is linked to field independence and to academic and vocational success.

If self efficacy is related to one's perception of deserved success and if success is often contingent on neurological factors, when do biological factors begin to impact on human learning? For some children, the beginnings are remarkably early and genetic in origin. Thus genes explain why girls with Turner's Syndrome are more successful when dealing with predominantly left than right hemispheric tasks. Failure to recognize hemispheric distinctions can increase failure rates in academic and other settings, reduce self confidence, and exacerbate emotions which hamper learning. In my experience, parents and school personnel have generally recognized that a Turner's Syndrome child has marked difficulty on visual spatial tasks, but relative strengths in the language domain. Unfortunately, a common educational response has been to ignore limitations imposed by brain structure and function and to emphasize visual-spatial enrichment activities in which the child, for neurological reasons, cannot succeed. Consequently the cycle of failure exacerbates emotional symptomatologies.

Phenylketonuria (PKU) is another of many conditions which illustrate the interaction of emotional and neurological factors. A recessive condition linked to mental retardation and a by- product of an inactive liver enzyme, PKU is a condition which illustrates the linkage of genetic/neurological disorders and emotional symptoms such as anxiety, temper tantrums, and depression and social anxiety. Years ago I worked with parents who implemented a dietary treatment

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program which had the potential to modulate the adverse impact of PKU on cognitive development. However, the diet was rigorous and often not implemented because of emotional factors embedded in interaction of children and their primary caretakers.

Recent investigations have revealed powerful interactions of emotional and neurological forces as early as conception. Historically, developmental psychologists have encountered enormous and still unresolved obstacles in comprehending why, as the brain develops, some signaling molecules bind to receptors by attracting or rejecting, and what might be done to enhance the impact of attractive forces so that axons maintain forward thrust in completing the wiring of the brain (Hall, 2001; Stein et al, 2001). We now have a better understanding of that remarkable phenomenon.

Early during the intra-uterine stages of life, developing embryo nerve cells, like Odysseus in the ancient fable of the Trojan wars, necessarily travel great distances and withstand numerous temptations to reach their neurologically appropriate destinations. Many embryonic nerves must be good sailors indeed. Finding some targets is similar to striking the bulls-eye at 1,000 yards through a mist and even around several peninsulas. And there is no allowance for error – faulty wiring can severely impair cognitive and behavioral interactions. Throughout that early voyage, brain pairs of signaling molecules optimally interact with corresponding receptors in the neurons, as predetermined by the receptors' protein structure. In this process the axon or signal-bearing cable lines contain a special conal tip which conveys the receptors. But some molecules attract by signaling while others repel, and may or may not bind to the receptors. Consequently and if we use a geographical model, some nerve cells destined for Seattle may end up in Hong Kong, with all that means regarding cognitive interactions, academic success, and self efficacy.

Most psychologists have witnessed the tragic consequences when axons fail to switch on at the right instance, thus thwarting neuronal forward movement. In a global sense, the impact of such developments appears in maternal alcohol or cocaine abuse during pregnancy which may kill or disable millions of brain cells and prompt axons to become deaf to or to ignore molecules originally destined to enhance brain development. More specific damage may appear along a wide spectrum of exceptionalities, including children with ADHD or learning disabilities. Such conditions, impacting more children than many assume, cause windows of learning opportunities to be slammed shut early in life, sometimes before birth. In an ideal world, it is the

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psychologist's task to discern which windows are closed and which remain open and for how long.

Following Bandura's formulations, we can assume a high incidence and greater severity of emotional symptoms if psychologists fail to facilitate a reasonable concordance of what a child can do and what that child is expected to do, not only at school but in other ecological settings. It is therefore at least arguable that contemporary psychology may place insufficient attention to comprehensive assessment of vulnerable children.

Should thorough assessments be implemented, *g* or general intelligence is where we should typically begin, and then proceed to appraise behaviors within the two primary domains of *g* – crystallized intelligence or well learned facts and primarily left hemispheric functions, and fluid intelligence, generally holistic in nature and reflective of right hemispheric functioning. Beyond amplifications of *g* lie a multitude of diagnostic considerations, so many in fact it is unrealistic to assume that we presently have the knowledge to assess the multiple subtle relationships that bind emotional and neurological phenomena.

Evidence that *g* is a robust personality component continues to accumulate; a team of German and English psychologists recently reported evidence that intense mental activities activate certain small and clearly defined regions of the frontal lobe. Science may eventually document how early neuronal dynamics in the developing brain promote or deter acquisition of higher *g* functioning. Furthermore, and generally, cognitive functions of right and left hemispheres, or crystallized and fluid general intelligence, present opportunities for clinical applications which foster self efficacy. The two hemispheres are not only asymmetric, they involve different perceptions of reality; each half has its specialization, despite cross hemispheric talk facilitated by the corpus callosum. Generally the left hemisphere, more heavily weighted in language functions and in crystallized intelligence, more significantly influences logical, analytical and sequential processing as well as retrieving, understanding, and correctly sequencing letters and numbers. With its relatively greater weight in fluid intelligence, the right hemisphere generally plays a more pronounced role in holistic and simultaneous learning as well as synthesis of visual, spatial, musical, and artistic stimuli and visually scanning pages. For parents and teachers, it is useful to recognize that right hemispheric lesions are likely to result in fragmentation of visual-constructive tasks.

Dyslexia, not a diagnostic entity because of various cultural-specific

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manifestations which include genetic proclivities, provides still additional evidence of neurological-emotional interaction, especially when Bandura's formulations are considered. As one illustration of this, a recent study of Italian, English, and French dyslexic children revealed that, across nations, dyslexics were equally impaired with respect to their controls in reading and phonological tasks (Paulesu, E. et al., 2001). Positron emission tomography scans during implicit and explicit reading revealed the same reduced activity in a region of the left hemisphere, consistent with other evidence of a universal neurocognitive basis for dyslexia in reading performance. However, Italian dyslexics used more shallow orthography which facilitated reading. Again it is reasonable to ask how many children have suffered emotional harm when educators ignored neurological implications and, true to prevailing schooling practices which ignore biological issues, focused only on curricular issues.

Some psychologists skillfully differentiate subtle associations between emotional symptoms and neurological disorders by detecting localized irregularities which may occur in such brain sections as the Broca and Wernicke areas, and in assessing brain-behavioral-emotional implications depending on the speed in which a person processes information.

Gray's research holds promise for implementing more productive interventions with children presenting ADHD symptoms. Thus some children with ADHD present conflicting brain systems. In Gray's formulations the Behavioral Inhibition System acts to inhibit behavior in new situations, such as those events which elicit fear, punishment or nonreward. The Behavioral Activation System is sensitive and responsive to reinforcements and rewards. Learning and behavioral problems of ADHD are seen as inordinately linked to an underactive Behavioral Inhibition System which in the absence of our understanding of what a child experiences and can realistically be expected to accomplish, is likely to create obstacles in inhibiting and effectively employing self regulatory and executive functioning operations, and thus reduce success and lower self efficacy.

Gray has also illustrated how hemispheric structures of the brain implicated in ADHS influence quasi-unique cognitive patterns. Should such patterning not be identified and appropriate educational strategies delayed or not implemented, Gray's biophysical and Bandura's more situational model both predict increased risk of low self efficacy. Neurological patterns, noted with ADHD and other neurologically impaired children, involve (1) smaller than average right frontal areas,

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caudate nucleus and globus pallidus, (2) somewhat larger right hemisphere than left, which is sometimes associated with inhibition problems, (3) decreased blood flow and lower glucose employment, (4) underarousal as indicated by electrical responses, assessment of heart rate, and skin conductance, and (5) unusual brain chemistry implicating the neurotransmitters, dopamine and serotonin. Any of these and related neurological conditions ideally require sensitivity and skill translating the impact of cognitive profiles into realistic learning objectives.

In deciding whether to appraise the interaction of children's neurological disorders and emotional symptoms, psychologists must answer three questions. First, does brain structure and function play a significant role in emotional patterns and human learning? Second, does success promote self efficacy and, finally, do psychologists perform a more credible role if they assess possible linkages of a child's learning problem, of cognitive strengths and weaknesses, and self efficacy? Current literature indicates that psychologists are keenly divided on all three questions.

Seeking to clarify such issues and influence public policies, James Popham (2000) recently deplored the current trend to rate or grade schools on the basis of what children learn as judged solely by standardized test scores. Popham contends that educators are in a "no win" situation if they accept accountability based by student learning rates; this, he argues, is impractical because most of what students learn is dependent on home influences and genetics which if read large includes issues germane to the interplay of neurological disorders and emotional symptoms. Nonetheless many influential educators believe that schools should assume virtually all responsibility for what children do or do not learn. One popular school-based reform – with variants referred to by such rubrics such as mainstreaming, untracking, and inclusion – essentially makes that assumption by implementing educational strategies based on the belief all children can perform high level tasks, irrespective of individual children's personal developmental history, existing knowledge base, or what has and does occur beyond the classroom. As a classroom teacher in inner city schools I was sometimes coerced into untracking: effective teaching was simply impossible as I struggled, under administration fiat, to teach the same material to eighth grade students whose reading skills extended from second grade through the first year of college.

The inclusion perspective assumes that giving student work on their level – thus adjusting curricula expectations to the diversity of student

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abilities and competencies and assessing biological and ecological factors – is undemocratic and aimed at perpetuating presumed social injustices. Recently at our university the administrator of an inner city school district informed prospective teachers that he regularly urges students in his district to believe that they can all become doctors. Given Bandura's formulations of self efficacy, it is difficult to imagine a better scenario for creating low self esteem and intensification of emotional symptoms adverse to effective learning.

Should all students be provided demanding curricula irrespective of what they are capable of learning? Many of the upperclass and graduate students I teach generally respond with an enthusiastic "yes." Invariably however a high proportion of these students and future educators know little about assessment, self efficacy, the dynamics of human development, and the relevance of understanding the diversity of student potentials and packaging knowledge of student quasi-uniqueness into appropriate intervention strategies. As one illustration of this, in one of my university classes, a graduate student who taught four autistic children questioned the value of employing standardized achievement scores to guide instruction: trained in the "problem solving approach", she taught the same material to her four special students. Open to new ideas, the student willingly agreed to secure the children's scores in one critically important curricular domain: vocabulary. To her surprise, student performance on the vocabulary test extended from the second to 62nd percentile. No aptitude scores were available for the children: more comprehensive assessment might have revealed a significant verbal-performance split, with direct neurological and emotional implications. Given the current anti-standardized testing mood in this teacher's district, it is difficult to comprehend how teachers differentiate attainable from unattainable curricular objectives any more effectively than my inquisitive student who had given similar assignments to her four charges.

For better or worse, the "one size fits all" curriculum has marched into American schools, espoused by some of the most influential leaders of contemporary American education. Thus in a recent American Educational Research Association (AERA) presidential address, James Banks (1999) proposed that educators' greatest responsibilities are not to seek truth but to conduct studies which produce "greater social good." To reach that goal, Banks urged inclusion and thus placement of children in the same instructional groups regardless of academic skills or aptitude. Conversely Banks attacked standardized and especially aptitude or IQ tests as

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instructional instruments used by those who "seek to disempower marginal groups and groups of color," or in other words, mainstreaming opponents are "racist."

It is rather surprising that that Banks, speaking as past president of the AERA, impugns as racist those who urge that educational strategies consider both biological and environmental contributions to human learning. Banks reserves his praise for those "anti-racist" social scientists who persuaded the Supreme Court in *Brown vs. Board of Education* that forced bussing or assignment of children solely on the basis of race, would significantly increase learning profiles of African American students.

Those whom Banks attacked as "racist" were simply social scientists who, calling the shots as they saw them, predicted that busing would prove unhelpful and probably even harmful to African American children, a prediction that has come true. (Jackson, 2000; Scott, 2000) Has forced busing enabled educators to close the achievement gap, as scientists praised by Banks anticipated? Hardly. In April 2001, the National Educational Goals Panel reported results of its seven year study of reading and math scores of the National Assessment Educational Program: the results? Discouraging: the gap between reading scores of white and minority students widened. Said Emily Wurtz, the group's acting director: "This is puzzling because there's not a quick fix answer," (to closing the racial achievement gap). (Waterloo Courier, April 17, 2001; Zernike, 2001) Panel officials "were at a loss to explain results" and will remain in a muddled mental framework until the climate in American social science permits researchers to honestly report data, without risky *ad hominem* attacks such as exemplified by Banks' prestigious AERA presented address: coercive language can only discourage civil debate aimed at implementing effective education for all students, irrespective of such variables as social class, individual class, and ethnicity.

Current emphasis on inclusion and deemphasis on standardized testing not infrequently pressures psychologists to ignore the impact of neurological disorders on children's emotional well being. Jeannie Oakes, perhaps the single-most influential mainstreaming proponent, alleges that aptitude testing is based on what she terms "such erroneous concepts" as the viability of general intelligence or *g*, that *g* is fixed early and that early learning skills are common precursors of later educational and vocational success. Intelligence tests, says Oakes, have created and perpetuated social and ethnic inequalities and bias by emphasizing the significance of heredity and biology to human

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development. Further, the American Psychological Association (APA) has financed publications which deny that intelligence is in part genetically determined – I must repeat the words "in part" since virtually no research validates the irrelevance of genetics to comprehending human intelligence, a relationship well established by longitudinal studies of identical and fraternal twins. Ironically, and indicative of a theoretical divide between APA leaders and members, seven separate APA divisions invited professor Jensen to present an address at the 2000 APA Convention which focused on the significance of *g* to applied psychological practices. But a curtain of silence fell over that presentation, which went unmentioned by the organization's official publication, *The APA Monitor*, in its extensive report of convention highlights.

Are most future psychologists trained to comprehend the dynamics of emotional and biological symptomalogies? Admittedly the line between a predominantly emotional and predominantly biological condition is often deceptively thin as witnessed by moderate but significant relationships between memory impairment and depression But we seem to be moving toward less, not more, clinical assessment, less but not more thorough assessment. Some studies persuasively document deemphasis in psychology training programs in such domains as administration, scoring, and interpretation of standardized tests. Certain training institutions limit requirements to administration of one Wechsler test. Given that psychologists rate the Wechsler test as one of the most useful tools in the assessment armamentarium, it is nonetheless difficult to believe that administration of one Weschler test – whether that one test be the *WPPSI*, *WISC*, or *WAIS*, – suffices if a prospective psychologist is to obtain requisite assessment skills. Even the Weschler, a relatively straightforward instrument, requires finely honed competencies: no single pattern exists to appraise quasi-unique patterns of human development, brain damage, emotional, or social/culture impairments. Wechsler assessment requires not only sensitivity in identifying nuances along such variables as memory, learning, perceptual organization, problem-solving, abstract reasoning, ability to shift set, attention, concentration and perseverating behavior: the evaluator also present a viable reason *why* these behaviors occur.

Referral sources understandably expect psychologists to command certain knowledge such as that children with brain injury *generally* perform more effectively on verbal than performance tasks. Additionally, relevant subtest patterns often warrant central considerations; as one example, Digit Span and Arithmetic scores are

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frequently lower in a brain damaged population, especially if there are left hemispheric lesions. Low scores on the Block Design subtest should be viewed as possible evidence of right hemispheric damage. Other nuances further challenge serious psychologists. Thus although the Information, Picture Completion and especially Vocabulary subtests often prove most resistive to organicity, some brain injured children encounter their *greatest* difficulty on the Vocabulary subtest, especially if there has been left temporal damage marked by deficits with word comprehension, retrieval, and language expressiveness: these are all behavioral domains which can significantly impact on self-efficacy, within and beyond home and school.

Critics are of course correct in pointing out limitations of standardized tests. But the larger risk lies in not recognizing how such measures can be appropriately used, not in throwing the baby out with the bathwater. Recent Federal initiatives have delegated increased educational responsibilities to States. Therefore it is useful to examine what transpires in Iowa. Encouraged by certain policies of the Iowa Department of Education, at least four Area Education Agency (AEA's) explicitly ask psychologists not to administer IQ tests, a trend observable in other states. Some university training programs follow suit. The impact of scaling back competency requirements in standardized testing raises potential questions. Consider just one: presently the U.S. Supreme Court weighs possible elimination of the death penalty for persons with IQs in the mentally retarded range. But the Justices must examine evidence of wide IQ differences in scores of the defendant for whom the death penalty is or is not to be consummated. Or should the justices rely solely on the one global IQ of 53?

Returning again to psychological practice in Iowa, some State officials now relegate IQ assessment to virtual obscurity on the assumption that aptitude tests merely "test and place" children on the basis of IQ scores, a simplistic strategy which was indeed widely practiced and in some places continues to be employed. But dropped into Orwell's memory hole are dozens of written communications and seminars from the 1960's well into the 1980's, whereby Iowa Department of Education policies literally forced school psychologists to "test and place," over adamant objections of psychologists opposed to such inappropriate focus solely on IQ scores.

To investigate the impact of current State endorsed reform as reported to me by dissenting psychologists, I gathered information from AEA individuals primarily responsible for assessment. The diversity of

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answers revealed extensive uncertainty about aptitude assessment. Several administrators reported a readiness to use IQ measures when necessary, but indicated this would be rare and that in practice, such testing received scant attention. Not one administrator volunteered concern about possibly overlooking neurological factors in assessment of vulnerable students. Some administrators averred that if a child performs significantly below grade level, intervention should employ concentrated academic enrichment. One administrator declared that it is unimportant why a child functions far below classmates in academic areas: for such a child, emphasis should be placed on curricular strategies such as determining how many words a child can read and then increase the reading rate by curricular enrichment. No need to examine developmental and health factors or family/community dynamics.

Another administrator reported that one sees little concentration on IQ in schools because of State accountability regulations; districts are therefore encouraged to use criterion-referenced instruments whereby students are measured on the basis of academic proficiencies. However, she could not explain how or why accountability regulations curtailed aptitude testing, nor could she identify a standardized or nonstandardized instrument that was indeed "accountable." Given the emphasis on observed proficiencies, she proposed assessment based on behavioral counts of an exceptional child, compared with behavioral counts of a randomly selected classmate. Another supervisor reported that IQ tests are suspect since evaluation materials must not discriminate on a cultural or racial basis: he could not identify a single standardized test that met this criterion as he understood it. Other AEA administrators cited rating scales and interviews, which they acknowledged lack validity and reliability.

Summing up, children vary greatly in how and why they approach new situations and how and what they are ready to learn. Ideographic and nomothetic data reveal that a substantial number of children present developmental and neurological disorders with powerful biological correlates which not uncommonly result in a broader band of intra-child cognitive variation. Further, and if we accept Bandura's postulates, a child suffers lower self efficacy if his or her quasi-unique learning profile is not identified and appropriate steps not taken to match curricular expectations with what a child can realistically be expected to learn in a manner which provides more basic learning to the less experienced child, and more challenging tasks for the child prepared to succeed in such tasks.

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Standardized measures provide psychologists with some of the most demonstrably valid measures for ascertaining what a child with or without a neurological disorder can and can't do, and thus provide some of the most useful guides for appropriate intervention designed to ameliorate emotional symptomologies. In many psychological circles, issues such as those reviewed this morning are not candidly dialogued, but have become politicized, often rendering the brain's limbic system sufficiently powerful to cripple the cerebral cortex. Yet if we are to maintain psychology's presumably apolitical mission and authentically serve society and those who comprise it, the interactive influences of environment and biology must be addressed in civility: Let the talks begin.

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Crime as Destiny
A Study of Criminal Twins

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Foreword by J. B. S. Haldane

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This is a reprint of the original 1931 translation by Charlotte Haldane of the pioneer 1928 study conducted by J. Lange of the criminal records of a number of monozygotic and dizygotic twins. It is a classic work of outstanding interest to all who students of criminology, heredity or twin studies.

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National IQ and Economic Development: A Study of Eighty-One Nations

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The authors examine the hypothesis that the intelligence of the population is a major factor determining national differences in economic development. To test the hypothesis, national IQs were calculated for 81 nations and economic development measured by real Gross Domestic Product at Purchasing Power Parity for 1998. The correlation between the two is .733, indicating that 54 per cent of the variance in GDP is attributable to the IQs of the populations.

Since the eighteenth century social scientists have attempted to find solutions to the problem of why some nations have developed economically and become wealthy while others have stagnated economically and remained poor. In contemporary times there are huge differences in per capita income between the economically developed world of North America, Western Europe, Australasia and the Pacific Rim, and the economically underdeveloped world of South Asia, the Caribbean, much of Latin America, and Africa. This problem has been discussed by economists, political scientists, sociologists, psychologists, anthropologists and historians. These have advanced numerous theories of the causes of these disparities, including advantageous or disadvantages climates, the possession of natural resources, economic and political systems, and psychological attitudes and values such as the work ethic.

We do not attempt to review all the theories of the causes of the wealth and poverty of nations. This is a subject on which numerous books have been written and with which several journals are concerned, notably the Journal of Economic Growth, the Journal of Comparative Economics, Economic Development and Cultural Change, Development and Change, and Development Economics. Our purpose is to present a new theory that has not been advanced hitherto. This is that a major factor responsible for national disparities in economic development is the intelligence (IQ) of the populations.

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Theoretical Background: IQ and Earnings among Individuals

There are strong theoretical reasons for the theory that the intelligence of national populations is likely to be a significant determinant of economic growth and development. The first of these is that it is well established that intelligence is a significant determinant of incomes among individuals. We believe it is reasonable to treat nations as aggregates of the individuals, so that nations with high average IQs can be expected to have high average earnings.

The major studies of the relationship between intelligence and earnings are summarized in Table 1. All of these studies are for the United States. The first entry in the table (Duncan,1968) presents data from the 1964 Current Population Survey carried out by the National Opinion Research Center (NORC) on a sample of white males aged 24-35. The second entry from Jencks (1972) is derived from a synthesis of the American research literature up to 1970. The third and fourth entries (Brown and Johnson,1995) are derived from a study of the relation between the IQ of males measured in early adulthood and earnings approximately 12 years later for samples of 24,819 whites and 4,008 blacks and reported correlations of .327 and .126, respectively. The fifth entry (Murray,1998) is derived from the National Longitudinal Study of Youth nationally representative American sample of 12,686 and finds a correlation of .37 between the IQ of males measured in adolescence and income approximately twelve years later, assessed in the late twenties to mid-thirties. It is apparent that the four results for whites are closely similar, all lying in the range between .31 and .37 and averaging .34. The one correlation for blacks of .13 is substantially lower but nevertheless statistically significant. The main reason for the lower correlation among blacks is possibly that greater numbers of intelligent blacks born into poverty do not obtain the educational credentials generally required for average to high earnings.

Table 1. Studies on the correlations between IQ and earnings among individuals

Correlation	*Reference*
.31	Duncan,1968
.35	Jencks,1972
.33	Brown & Reynolds,1975
.13	Brown & Reynolds,1975
.37	Murray, 1998

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The effect of a correlation of approximately .34 between intelligence and earnings is to produce quite considerable differences in the earnings of high and low IQ groups. As Jencks (1972, p.222) noted, men inducted in the Korean War who had been tested and scored above the 80th percentile for intelligence, representing IQs of 110 and over, had personal incomes when they returned to civilian life 34 percent above the national average. Conversely, the military inductees who scored below the 20th percentile on intelligence, representing IQs of below 90, had personal incomes when they returned to civilian life approximately 34 per cent below the national average.

Those who have considered this question have concluded that IQ is a cause of income because IQ's are established quite early in childhood and predict incomes achieved in adulthood (e.g. Duncan, 1968; Duncan, Featherman and Duncan,1972; Jencks,1972; Jensen,1998). Furthermore, several studies have shown that intelligence assessed in childhood from the age of about 8 years and above is fairly stable over the life span and is correlated at about .7 to .8 with intelligence in adulthood (McCall,1977; Li,1975). The longest span of time over which a high stability of IQ has been demonstrated is 66 years. This was shown in a study by Deary et al. (2000) in which 101 children intelligence tested in 1932 at the age of eleven were tested again in 1998 at the age of 77. The correlation between the two scores was .77. Because intelligence is established in childhood, the causal sequence is likely to be from IQ to earnings because, obviously, earnings in adulthood cannot be a cause of IQ. While it might be argued that the socio-economic status of the family is the common cause of children's intelligence and subsequent earnings, it has been shown by Duncan, Featherman and Duncan (1972) and by Jencks (1979) that the positive relation between childhood IQ and adult income is present when parental socio-economic status is controlled. We therefore believe that those who have concluded that IQ and has a causal impact on earnings are correct.

The explanation for the positive association between IQ and income is that people with high IQs learn more rapidly and can solve problems more effectively than those with low IQs. Children and adolescents with high IQs can be trained to acquire more complex skills and work more proficiently than those with low IQs. This makes them more productive and able to earn higher incomes. An early study showing the positive effect of IQ on trainability was carried out during World War Two in the training of pilots for the American Air Force. Initially, the Air Force admitted those of all ability levels to its pilot

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training program but soon discovered that significant numbers proved to be untrainable and this resulted in an unacceptably high failure rate. It then examined the effect of intelligence on success in the training program and found that 95 percent of those in the top 10 percent of intelligence successfully completed the training, while only 20 percent of those in the bottom 10 percent were able to complete (Matarazzo,1972). Further work by the American military has confirmed that it is difficult and often impossible to train inductees with low IQs. A series of reports on the experience of the military on this issue has been summarized by Gottfredson (1997, p.91): "All agree that these men were very costly and difficult to train, could not learn certain specialities, and performed at a lower average level once on a job. Many such men had to be sent to newly created special units for remedial training or recycled one or more times through basic or technical training". As a result of this experience the United States military no longer accepts recruits with IQs below 80.

There have been two major reviews of studies examining the relation between IQ and trainability for the acquisition of skills. The first consists of a meta-analysis by Hunter and Hunter (1984) of 425 studies which have used the General Aptitude Test Battery (GATB), a test of general intelligence, for the prediction of training success. They classified jobs into two categories of general and industrial. Their conclusion was that for all occupations, IQ predicts job training success at a correlation of .45. When jobs are classified according to their complexity, IQ correlates more highly at .56 to .58, than it does for jobs of low complexity, for which the correlations are between .23 and .40. The details of the correlations are shown in Table 2.

Table 2. Correlations between IQ and training success

Job Complexity	*Training*
High - general	.50
High - industrial	.65
Medium - general	.57
Low - general	.54

The second major review of the relation between intelligence and training success consists of data collected from American military training schools. All recruits to the American military are given an intelligence test, the AFQT (Armed Forces Qualification Test). They

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are also sent to training schools. At the end of training, they are assessed for how well they have done on the course by tests assessing job performance, knowledge and skills. The results based on a sample of 472,539 military personnel have been analysed by Hunter and Hunter (1984), who present the correlations between IQ and training success for five types of training, namely Mechanical, Clerical, Electronic, General Technical and Combat. These correlations are shown in Table 3. It will be seen that all the correlations are substantial and lie between .45 and .67. The magnitude of the correlations depends on the cognitive complexity of the skills assessed. The highest correlation is for Electronics, which is the most cognitively demanding. The lowest is for Combat, which is the least cognitively demanding and for which success is heavily dependent on physical skills, but even for this the correlation of .45 is appreciable.

Table 3. Correlations between IQ and training success in the United States Military

Job Type	*Training Success*
Mechanical	.62
Clerical	.58
Electronic	.67
General Technical	.62
Combat	.43

IQ and Earnings among Populations

Because IQ is a determinant of earnings among individuals, it can be predicted that IQ should be a determinant of the earnings of populations. There is much evidence that this is the case. The major studies are summarized in Table 4. All the correlations in the table are statistically significant. The first of these studies by Sir Cyril Burt took as its population units the 29 boroughs of London. The second took as its population units the states of the U.S.A. The third, fourth and fifth took as their population units 13 regions of the British Isles, 90 departments of France, and 48 regions of Spain.

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Table 4. Correlations between IQs and earnings among populations

Location	*Correlation*	*Reference*
London	.73	Burt, 1937
American states	.81	Davenport & Remmers, 1950
British Isles	.73	Lynn, 1979
France	.61	Lynn, 1980
Spain	.65	Lynn, 1981

The reason that IQ is highly correlated with per capita income across populations is that populations are aggregates of individuals. Because individuals with high IQs are able to secure high earnings, so populations with high IQs are likewise able to secure high earnings.

Method

We are now ready to consider whether there are national differences in intelligence which may contribute to per capita national incomes and to rates of economic growth that have led to differences in national incomes. We begin by presenting data for national IQs for 81 nations. We show that these are reliable and highly associated with national levels of educational attainment. We show next that national IQs are significantly associated with national rates of economic growth and per capita incomes during the second half of the twentieth century. We then consider some anomalies and exceptions to the general principle that national IQs are a significant determinant of economic growth and per capita incomes.

1. Calculation of National IQs

Most intelligence tests have been constructed in Britain and the United States and these tests have subsequently been administered to samples of the populations in many other countries throughout the world. From these studies we have found it possible to calculate the mean IQs of the populations of 81 nations. In making these calculations the mean IQ in Britain is set at 100 with a standard deviation of 15 and the mean IQs of other nations have been calculated in relation to this standard. We do not have space here to provide the details of how these calculations have been made. Those who wish to examine these are referred to Lynn and Vanhanen (2002). We should note that although the 81 nations for which national IQs have been calculated are not a random sample, they are a representative sample of the world's nations in so far as they include nations from all continents and from

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Table 5

Data for National IQs, attainment in Math and Science, Real GDP per capita 1998, Residual GDP following regression analysis and Fitted GDP

Country	*IQ*	*Math*	*Science*	*GDP*	*Residual GDP*	*Fitted GDP*
Argentina	96	-	-	12,013	-2,094	14,107
Australia	98	525	540	22,452	7,307	15,145
Austria	102	-	-	23,166	5,945	17,221
Barbados	78	-	-	12,001	7,236	4,765
Belgium	100	558	535	23,223	7,040	16,183
Brazil	87	-	-	6,625	-2,811	9,436
Bulgaria	93	511	518	4,809	-7,741	12,550
Canada	97	531	533	23,582	8,956	14,626
China	100	-	-	3,105	-13,078	16,183
Colombia	89	-	-	6,006	-4,468	10,474
Congo (Brazz)	73	-	-	995	-1,175	2,170
Congo (Zaire)	65	-	-	822	2,804	-1,982
Croatia	90	-	-	6,749	-4,244	10,993
Cuba	85	-	-	3,967	-4,431	8,398
Czech Republic	97	520	539	12,362	-2,264	14,626
Denmark	98	-	-	24,218	9,073	15,145
Ecuador	80	-	-	3,003	-2,800	5,803
Egypt	83	-	-	3,041	-4,319	7,360

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Table 5

Data for National IQs, attainment in Math and Science, Real GDP per capita 1998, Residual GDP following regression analysis and Fitted GDP

Equatorial Guinea	59	-	-	1,817	6,913	-5,096
Ethiopia	63	-	-	574	3,594	-3,020
Fiji	84	-	-	4,231	-3,648	7,879
Finland	97	520	535	20,847	6,221	14,626
France	98	-	-	21,175	6,030	15,145
Germany	102	-	-	22,169	4,948	17,221
Ghana	71	-	-	1,735	603	1,132
Greece	92	-	-	13,943	1,912	12,031
Guatemala	79	-	-	3,505	-1,779	5,284
Guinea	66	-	-	1,782	3,245	-1,463
Hong Kong	107	582	530	20,763	946	19,817
Hungary	99	532	552	10,232	-5,432	15,664
India	81	-	-	2,077	-4,245	6,322
Indonesia	89	403	435	2,651	-7,823	10,474
Iran	84	422	448	5,121	-2,758	7,879
Iraq	87	-	-	3,197	-6,239	9,436
Ireland	93	-	-	21,482	8,932	12,550
Israel	94	466	468	17,301	4,232	13,069
Italy	102	479	493	20,585	3,364	17,221
Jamaica	72	-	-	3,389	1,738	1,651
Japan	105	579	550	23,257	4,478	18,779

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Kenya	72	-	-	980	-671	1,651	
Korea, South	106	587	549	13,478	-5,820	19,298	
Lebanon	86	-	-	4,326	-4,591	8,917	
Malaysia	92	519	492	8,137	-3,894	12,031	
Marshall Islands	84	-	-	3,000	-4,879	7,879	
Mexico	87	-	-	7,704	-1,732	9,436	
Morocco	85	337	323	3,305	-5,093	8,398	
Nepal	78	-	-	1,157	-3,608	4,765	
Netherlands	102	540	545	22,176	4,955	17,221	
New Zealand	100	491	510	17,288	1,105	16,183	
Nigeria	67	-	-	795	1,739	-944	
Norway	98	-	-	26,342	11,197	15,145	
Peru	90	-	-	4,282	-6,711	10,993	
Philippines	86	345	345	3,555	-5,362	8,917	
Poland	99	-	-	7,619	-8,045	15,664	
Portugal	95	-	-	14,701	1,113	13,589	
Puerto Rico	84	-	-	8,000	121	7,879	
Qatar	78	-	-	20,987	16,222	4,765	
Romania	94	472	474	5,648	-7,421	13,069	
Russia	96	526	529	6,460	-7,647	14,107	
Samoa (Western)	87	-	-	3,832	-5,604	9,436	
Sierra Leone	64	-	-	458	2,959	-2,501	
Singapore	103	604	568	24,210	6,470	17,740	
Slovakia	96	534	535	9,699	4,408	14,107	
Slovenia	95	530	533	14,293	705	13,588	
South Africa	72	275	243	8,488	6,837	1,651	
Spain	97	-	-	16,212	1,586	14,626	

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Table 5

Data for National IQs, attainment in Math and Science, Real GDP per capita 1998, Residual GDP following regression analysis and Fitted GDP

Sudan	72	-	-	1,394	-257	1,651
Suriname	89	-	-	5,161	-5,313	10,474
Sweden	101	-	-	20,659	3,957	16,702
Switzerland	101	-	-	25,512	8,810	16,702
Taiwan	104	585	569	13,000	-5,260	18,260
Tanzania	72	-	-	480	-1,171	1,651
Thailand	91	467	482	5,456	-6,056	11,512
Tonga	87	-	-	3,000	-6,436	9,436
Turkey	90	429	433	6,422	-4,571	10,993
Uganda	73	-	-	1,074	-1,096	2,170
U. Kingdom	100	496	538	20,336	4,153	16,183
United States	98	502	515	29,605	4,460	15,145
Uruguay	96	-	-	8,623	-5,484	14,107
Zambia	77	-	-	719	-3,527	4,246
Zimbabwe	66	-	-	2,669	4,132	-1,463

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all levels of economic development including the "first world" of the economically developed market economies, the "second world" of the former communist economies of the Soviet Union, Eastern Europe and China, and the "third world" of economically developing and undeveloped economies of South and Southwest Asia, the Pacific Islands, Latin America, the Caribbean and Africa.

The data with which we are concerned are given in Table 5. This shows the IQs for the 81 counties, the mean scores of adolescents on tests of math and science in 30 of the countries obtained in the Third International Mathematics and Science Study of 1999, the per capita real GDP (Gross Domestic Product) in 1998, the "residual per capita GDP" (a measure of how much the actual GDP differs from the predicted GDP calculated from the regression of GDP on IQ: see further explanation below), and the "fitted per capita GDP" (the value of per capita GDP at the regression line: see further explanation below).

Looking first at the national IQs, we note that these fall into seven clusters. First, the 25 European nations have mean population IQs in the IQ range between 90 (in Croatia) and 102 (in Austria, Germany, Italy and The Netherlands). The median IQ for this group of nations is 98. Apart from Ireland (93), there is some trend for IQs to be higher in northern and western Europe, where the IQs are around 100, than in southern and eastern Europe, where the IQs tend to be in the low 90's, notably in Croatia (90), Greece (92), Bulgaria (93) and Romania (94). The depressed IQ in Ireland is attributable to a long history of selective emigration and to the low standard of living until the mid-1990's.

A second cluster consists of countries of North America and Australasia. The populations of mainly northern and western European origin have about the same IQs as those of their parent populations in Europe. The IQ of the 98 in the United States is slightly depressed because of the substantial numbers in the population of blacks and Hispanics, whose mean IQs are approximately 85 and 92, respectively (Herrnstein and Murray, 1994). The mean IQ of whites in the United States is 100 (Jensen and Reynolds, 1983), the same as that in Britain.

A third cluster consists of the five East Asian countries populated by Oriental peoples. In Hong Kong, Japan, South Korea and Singapore the mean IQs lie in the range of 104 in Taiwan to 107 in Hong Kong and are significantly higher than those in Europe. The IQ in the People's Republic of China is lower at 100. This is attributable to the economically backward state of the country and low living standards

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which have impaired the development of intelligence to its full potential. If the rapid economic growth of the 1990's continues, it can be anticipated that the IQ in China will rise to about 105, the same level as the other Oriental peoples.

A fourth cluster consists of the nations of South and Southwest Asia running from Turkey through the Middle East to South East Asia. The IQs lie in the range between 78 in Napal and Qatar and 94 in Israel. The IQ in Israel is higher than in the remainder of this group of nations. The explanation is that Israel is an ethnically diverse nation with about equal numbers of Western (European) and Eastern (Asian) Jews. Western Jews have an IQ about points higher than Eastern Jews (Lieblich, Ninio and Kugelmass,1972; Zeidner,1987). The IQ of Eastern Jews in Israel is approximately 88 and is closely similar to that of neighboring South Asian populations like Turkey (90), Lebanon (86), Iraq (87) and Iran (84). The IQ of Western Jews in Israel is approximately 100, and about the same as that of other Northern and Western European populations, although Jews in the United States and Britain have substantially higher IQs averaging around 110 or even 115 (Herrnstein and Murray,1994; MacDonald,1994). Most Western Jews migrated to Israel during the second half of the twentieth century and have raised the intelligence level above that of other south Asian populations.

A fifth cluster consists of the countries of South East Asia and the Pacific Islands. The IQs fall in the narrow band between 84 and 89.

A sixth cluster consists of the Latin America and the Caribbean countries. The range of IQs is considerable from 65 in Jamaica to 96 in Argentina and Uruguay. The IQs appear to be determined by the racial and ethnic make-up of the populations. In Argentina and Uruguay the populations are very largely European at 85 per cent for Argentina and 86 per cent for Uruguay (Philip's,1996). The IQs of 96 are typically European. The countries with lower proportions of Europeans and greater proportions of Native Americans, Blacks and Mestizos have lower IQs. This applies to Brazil with its IQ of 87 (53 per cent European, 22 per cent Mulatto, 12 per cent Mestizo, 11 per cent black); Colombia with its IQ of 88 (Europeans 20 per cent, Mestizos 68 per cent, Native American Indian 7 per cent, blacks, 5 per cent); Mexico with its IQ of 87 (9 per cent European, 60 per cent Mestizo, 30 per cent Native American Indian); and Peru with its IQ of 90 (12 per cent white, Native American Indian, 47 per cent, Mestizos, 32 per cent). Countries with very low percentages of Europeans have still lower IQs. This applies to Guatemala with its IQ of 79 (3 per cent

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white, 55 per cent Native American Indian, 42 per cent Mestizo); Barbados with its IQ of 78 (4 per cent European, 80 per cent black, 16 per cent Mulatto); and Jamaica with its IQ of 65 (3 per cent European, 3 per cent East Indian, 80 per cent black and 15 per cent Mulatto).

The seventh and final cluster consists of fifteen African countries. The two countries in North Africa, Egypt and Morocco, have higher mean IQs at 83 and 84, respectively, than any of the countries of sub-Saharan Africa. The explanation for this is that their populations are Caucasian and they are genetically part of the Caucasian family of peoples of Europe and South and Southwest Asia rather than to the African peoples south of the Sahara (Cavalli-Sforza, Menozzi and Piazza, 1996,p.78). The 13 countries of sub-Saharan Africa have IQs in the range between 63 and 78. The IQ is South Africa is estimated at 72. There have been a number of studies of the intelligence of these groups and their average IQs are whites: 94; blacks: 66; coloureds: 82; Indians: 83. The percentages of the four groups in the population are whites: 14 per cent; blacks: 75 per cent; coloreds: 9 per cent ; Indians: 2 per cent (Ramsay, 2000). Weighting the IQs of the four groups by their percentages in the population gives an IQ for South Africa of 72.

2. The Validity of National IQs

It has sometimes been argued that no valid comparisons can be made between IQs obtained from different nations. This is the problem of the "validity" of the national IQs presented in Table 6. One variant of this position is that intelligence tests are biased in favor of the white Americans and Europeans who construct them because they measure the cognitive skills taught or acquired incidentally in western cultures but not equally complex cognitive skills possessed by peoples of other cultures but not measured by western intelligence tests. For instance, it has been asserted by Kagan (1971,p.92) that "the IQ test is a seriously biased instrument that almost guarantees middle class white children higher scores than almost any other group of children ". The proposition that white Americans and Europeans "almost" inevitably perform better on the tests than other peoples has been shown to be incorrect by the accumulating evidence that the Japanese, Chinese and Koreans perform better on the tests than Americans and Europeans. It is not only in their own countries that these peoples achieve higher IQs than whites. Ethnic East Asians in the United States have a mean IQ of 104.4 in relation to a white IQ of 100 (Lynn, 1996).

Another variant of the position that intelligence tests do not provide valid measures of the mental abilities of different peoples has

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been advanced by Diamond (1997,p.20). He contends that the stone age peoples of New Guinea are more intelligence than westerners even though they do not perform so well on intelligence tests: "New Guineans impressed me as being on the average more intelligent, more alert, more expressive, more interested in things and people around them than the average European or American...Of course New Guineans tend to perform poorly at tasks that westerners have been trained to perform since childhood and that New Guineans have not." What Diamond is in effect contending here is that intelligence tests do not provide valid measures of the intelligence of peoples outside economically developed western societies.

Another assertion that no valid comparisons can be made between IQs obtained in different societies has been made on the grounds that intelligence has different meanings in different cultures. This view has been advanced by Irvine and Berry (1988, p.6) who write that "Our mature judgment is that most attempts to use test scores as operational measures of the mental status of groups or populations have little claim to scientific validity". Contrary to the view, it has been shown by Reuning (1988) that even among such a primitive group as the Bushmen hunter-gatherers of the Kalahari desert ability tests are positively intercorrelated and have a general factor similar to the g found in western studies, that the Bushmen have the concept that some people are bright and others dull, corresponding to similar notions in economically developed countries, and that these concepts correlate well with scores on intelligence tests. It has also been shown in numerous other studies of peoples from a variety of different cultures that cognitive abilities have the same pattern of positive intercorrelation and a general factor identifiable as g as has been found in the populations of economically developed nations. This has been shown to be true in Turkey (Kagitcibasi and Savasir,1988), for Ugandans, Eskimos and Native American Indians (Hakstian and Vandenberg (1988), and for blacks as well as whites in South Africa (Kendall, Verster and Mollendorf,1988).

To examine the validity of the national IQs we present evidence for the attainment of adolescents for 30 of the nations in math and science obtained in the 1999 study of achievement. These data are set out in columns 2 and 3 of Table 6. Looking at these results, we see that educational attainment is closely associated with national IQs. Thus in math the countries with the highest attainment in math are Singapore (604), South Korea (587), Taiwan (585), Hong Kong (582) and Japan (579). The countries of north west Europe and with predominantly

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north west European populations come next. Below these are the nations of south east Europe and west and south Asia. Finally, there is South Africa with by far the lowest score (275). The same correspondence between national IQs and educational attainment is present for science, for which the highest scores are obtained by school students in Singapore and Taiwan. The correlation between national IQ and attainment in math is .904 and between national IQ and attainment in science is .878.

This demonstration that national IQs are highly associated with educational attainment in math and science "validates" the IQs. It follows the long established methodology of the validation of intelligence tests among individuals by showing that they are positively correlated with measures of educational attainment. What these studies have shown is that intelligence tests measure something important and not simply the ability to perform well on the puzzles devised by psychologists. The same association is present across nations and shows that national IQs are measuring cognitive capacity as expressed also in the ability to master math and science. It shows that the national IQ figures are not biased in favor of white middle class American and British males and they are not measures of some trivial ability to do tests constructed by western psychologists.

Our major interest concerns the hypothesis that a country's economic success depends to a significant extent on the average intelligence of the population. We have adopted per capita national income as the best measure of countries economic success of countries. There are three measures of per capita national income. These are per capita Gross Domestic Product (GDP) expressed in 1990 US dollars, per capita Gross National Product (GNP) in US dollars and real Gross Domestic Product (GDP) per capita in US dollars. The last measure is calculated on the basis of the "purchasing power parity" (PPP) of the country's currency. It is intended "to make more accurate international comparisons of GDP and its components than those based on official exchange rates, which can be subject to considerable fluctuation" (Human Development Report 1997, p. 239). The three measures are quite highly correlated. We consider the third gives the most accurate measure of national per capita incomes. These are the data presented in the third column of Table 6. These data are taken from the United Nations Development Programme's (UNDP) *Human Development Reports*. The Pearson product-moment correlation coefficient between national IQs and real GDP is .733 and is highly statistically significant. The square of this correlation is .54 and indicates that 54 percent of the

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variance in national per capita income can be explained in terms of the average IQ of the populations.

The fact that the relationship between national IQ and per capita income is not perfect means that some countries have higher per capita incomes than would be predicted from their populations' IQs, while other countries have lower IQs than would be predicted. We now use regression analysis to examine these anomalies to a perfect relation between national IQs and per capita incomes. Regression analysis shows the extent to which the average relationship between national IQ and per capita national income applies to individual countries and which countries deviate most from the average relationship (regression line). The analysis of deviant countries should help to indicate other factors that have affected a country's economic development independently from its level of national IQ.

The results of the regression analysis are shown in the fifth and sixth columns of Table 6. In the fifth column (Residual real GDP), a negative sign indicates that the country has a lower per capita national income than would be predicted from its populations' IQ, while a positive residual indicates that a country has a higher per capita income than would be predicted from its national IQ. The predicted values of real GDP per capita in 1998 (Fitted real GDP) are given in the sixth column. It should be noted that because of the linear regression line, predicted or fitted values are negative for all countries for which national IQ is 67 or less. Because per capita income cannot be negative for any country, positive correlations for those countries are unrealistically high (for example, 6,913 for Equatorial Guinea). Such positive residuals are technical consequences of the regression equation $Y = -37{,}716 + 519 * X$.

The deviations from the regression line are due to a large number of factors, but by examining the figures it is possible to discern the most important of these. The countries with the largest negative residuals are China, Bulgaria, Poland, Romania, Russia and Indonesia. The first five of these have had their economies impaired by socialism and communism, while Indonesia suffered particularly severely from the economic downturn in East Asia in the 1990's. Another country with a large negative residual is Iraq, whose economy has been impaired by defeat in the Gulf war and subsequent economic sanctions.

The countries with the largest positive residuals are Belgium, Canada, Denmark, Ireland, Norway, Singapore, Switzerland, the United States, Qatar, Barbados and South Africa. The first eight of these are free market economies which for various reasons have performed

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exceptionally well economically. Norway has benefited from large oil revenues and Ireland from large European Economic Community subsidies. Qatar has gained from its huge oil earnings. Barbados and South Africa have performed better than predicted because their economies have been largely run by fairly small minorities of whites, who comprise 4 percent of the population of Barbados and 14 percent of the population of South Africa. It can be noted that this is also to some degree the case for Zimbabwe whose quite large positive residual is attributable to much of the economy being run by a small minority of whites.

Discussion

In this paper we have been concerned with an examination of the hypothesis that the intelligence of the populations is an important determinant of national per capita income. We have found that in this sample of 81 nations there is a correlation of .733 between national IQ and real per capita GDP in 1998 and we propose that this provides strong support for the hypothesis. The correlation explains 54 per percent of the variance in per capita income. The remaining 46 percent is attributable to a number of other factors. The most important of these is the extent to which countries have free market economies, which have helped to produce high per capita incomes, or have socialist economies, which have been responsible for low per capita incomes.

The reason that nations whose populations have high IQs have high per capita incomes (except in countries whose economies have been handicapped by socialism) is easy to understand. People with high IQs learn rapidly, work efficiently and can solve new problems. The principal reason that the free economies of the Pacific Rim (Japan, South Korea, Hong Kong, Taiwan and Singapore) have done so well economically in the decades following World War Two is that their populations have high IQs. The principal reason that the countries of sub-Saharan Africa and the Caribbean have done poorly economically is that their populations have low IQs.

For a number of reasons set out in Lynn (1991a, 1991b,1997) we believe that the national differences in IQs are largely genetically determined. Population geneticists have demonstrated that there are genetic differences between major geographical populations and races in numerous characteristics including skin and eye color, body shape, teeth, blood groups and susceptibility to genetic diseases (Cavalli-Sforza, Menozzi and Piazza 1996) and brain size (Rushton, 2000). For this reason it must be regarded as probable that differences

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in average intelligence are also partly genetic. The world's populations have evolved in almost total isolation for around 50,000 to 100,000 years. In these circumstances it is impossible that they would all have remained identical in their genes for intelligence. It would have been impossible for the genetic components of intelligence to remain the same in all populations through tens of thousands of years when all other characteristics of populations for which there is genetic variance in the population show geographical and racial variance as a result of adaptations to the environments in which they have evolved, as a consequence of natural selection. We believe that those who assert that the differences in national IQs have no genetic basis can never have thought of this question in terms of evolutionary biology. The principal reason for the national differences in intelligence appears to be that when early Homo sapiens migrated out of Africa and into Eurasia they encountered the harsher environments of cold winters. In order to survive they had to solve new and difficult problems of hunting large animals, making improved weapons and tools, and for making clothing, fires and shelters. The solution of these problems required greater intelligence and this required a further growth in brain size in the Caucasian and Oriental peoples.

The conclusion that national differences in economic development are to a significant degree determined by differences in the intelligence of the populations, and that these are in turn significantly determined genetically, must mean that the potential for reducing the gap between rich and poor countries is seriously limited. It is more probable that, with further technological development and increasingly complex and intellectually demanding economies, the economic inequalities between nations will increase even more in the future. The prospects of economic growth are best in countries with large negative residuals, because these indicate that a country's level of per capita national income is much lower than expected on the basis of its population's average level of intelligence. Consequently, the human potential for economic growth is greatest in the European and East Asian countries with large negative residuals, whereas the chances are poorest in the countries of sub-Saharan Africa. Nevertheless, intelligence is partly determined environmentally. The most important environmental determinant of intelligence appears to be the quality of nutrition received by the fetus and by the infant from its mother (Lynn,1990, 1998). Hence, aid to the third world should be targeted on attempting to improve the intelligence of the populations by improving the quality of nutrition. Nevertheless, we believe that the conclusion to be drawn from our

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study is that it will never be possible to achieve an economic equality between nations. The poor will always be with us. The world may need a new international moral code designed to accept and deal with the existence of significant differences in human mental abilities and consequent economic inequalities.

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Intelligence and National Achievement

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BOOK REVIEW ARTICLE

The Riddle of the Tarim Basin Mummies

Alexander Jacob
Toronto

The Bronze Age and Early Iron Age Peoples of Eastern Central Asia
Ed. V.H. Mair
Washington, D.C.: Institute for the Study of Man, 2 vols., 1998

The recent discovery of four thousand year old Europoid mummies in the Tarim basin (in Sinkiang, north of Tibet) has been one of the most extraordinary anthropological revelations of this century. For it demonstrates a very ancient Indo-European presence in China which may indeed have been responsible for the transmission of chariotry, metallurgy and weaving techniques to the Mongoloid peoples of the region. However, the exact Indo-European identity of the mummies has not yet been ascertained and scholars still wonder whether they were proto-Scythians or proto-Kelts or both.

The earliest of the mummies found in the Tarim Basin can be dated to around 2000 B.C., that is, before either the earliest Indic Mitanni kingdom in Western Asia (ca. 1600 B.C.) or the full flower of the Indo-Aryan culture in the Indus Valley (ca.1500 B.C.). However, the mummies bear no records of their earliest linguistic or spiritual status, and the Indo-European Tokharian language of the region is attested from a much later date (6th-8th c. A.D.) than the mummies, which can only tentatively be identified as belonging to the ancestors of the Tokharian speakers. Tokharian itself is a centum language unlike the satem Indo-Iranian languages.[1] The pictorial representations of the historical Tokharians however exhibit Indo-Iranianan attire, while the Tokharian texts themselves are related to the Indic Buddhist religion, which the Tokharians may have been instrumental in conveying to their Chinese neighbours.

[1] The western and eastern branches of the Indo-European family of languages are divided, roughly, by their use of 'c' or 's' in words like 'centum'/'satem' (=hundred).

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The collection of scholarly essays edited by Prof. Mair in *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia* sheds some focussed light on the mysterious origins of the Tarim Basin mummies. These two volumes indeed continue an earlier collection of essays edited by Prof. Mair which appeared in the *Journal of Indo-European Studies*, 23, 3.4. (Fall/Winter 1995) on the same subject of the Europoid mummies and their possible links to the Tokharians. The earlier collection contains some valuable studies by J.P. Mallory, D.Q. Adams, and D. Ringe on the archaeological and linguistic affiliations of the Europoid peoples of Eastern Central Asia and of the Tokharians, as well as an intriguing article by James Opie on the probable connection between the Tokharians and the Guti and Tukri tribes of western Iran, who were called, in ancient Greek records, the Getae. The Getae, or the Guti, were a mountainous tribe who were feared and hated by the Babylonians, who were ruled by them for a century towards the end of the second millennium B.C. When they were driven out of Iran by the Babylonians, the Guti, according to Opie, split into the Getae of Thrace (who were certainly Kelts), the Thyssagetae (the Wild Getae) of the Ishimskay Steppe, and the Massagetae (the Great Getae) of northwestern China, who were in all probability the proto-Tokharians.

The Proto-Indo-Europeans and Proto-Tokharians

The present collection of essays begins with an archeological reconstruction of the proto-Indo-European and proto-Tokharian peoples. Of particular note in the first section of the collection is Elena Kuzmina's article on the "Cultural Connections of the Tarim Basin and Pastoralists of the Asian Steppes in the Bronze Age". The earliest Central Asian presence of the ancient Indo-Europeans is traced back by Kuzmina to the Yamnaya culture (3500-2500 B.C.) in the steppes of southern Russia which, by the third millennium B.C., occupied the territory from the Danube to the Urals (p.71). Deriving from the Yamnaya culture is the Afanasievo culture "localized in the Altai and the Yenisei Basin as well as in Tuva and western Mongolia", dated to the second half of the third and the beginning of the second millennium B.C. Kuzmina conjectures that the Proto-Tokharians are connected to the "migration of the Yamnaya group of tribes eastward in the third millennium BCE" (ibid.). This might mean that "the Tokharians appeared in Eastern Turkestan earlier than Iranians and that they had contact with Finno-Ugrians" (p.72).

David W. Anthony presents a parallel reconstruction of the spread

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of horse-riding and chariot transportation in Central Asia. Horseback riding is documented in the western margin of the Eurasian steppe at the Copper Age site of Dereivka on the Dnieper river in Ukraine. This site belongs to the Sredni Stog culture of 4500-3500 B.C. The earliest wheeled vehicles appear west of the Caspian Sea in the Yamnaya culture (3500-2500 B.C.), for a slow, solid-wheeled wagon (not chariot) is found as early as 2900 B.C. at Bal'ki on the lower Dnieper (p.103). (The ox-drawn cart, or 'wagon', with solid wheels was indeed invented, according to Asko Parpola, in the ancient Near East around 3500 B.C., "whence it spread, apparently over the Caucasus, very widely over Eurasia within a couple of centuries", p.118). The Yamnaya culture is also associated with kurgan (or mound) burials, with the deceased placed in a grave pit with the knees raised. Many of the Yamnaya kurgans also reveal wagon or cart burials between 3000-2500 B.C. The Afanasievo culture (2500-2000 B.C.), which is derived from the Yamnaya, may have been associated with the Proto-Tokharians.

Parpola too tentatively identifies the Afanasievo culture with a "relatively early variety of Proto-Indo-European" and connects it most closely with the Proto-Tokharians, since "there are numerous Afanas'evo-related traits in the Keremchi culture of the Jungghar Basin right upto the eastern oases of Sinkiang" (p.119).

The Proto-Aryans

The next stage of development of pastoral steppe cultures is marked by the Andronovo period (beginning in the 17th B.C.), which is associated by Asko Parpola (p.129) chiefly with the Indo-Aryans. The Andronovo tribes, according to Kuzmina, made four crucial inventions, the technique of ore-smelting, fortified settlements, light war chariots harnessed to a pair of horses, and the breeding of swift, light horses for driving chariots (p.72f.). As Parpola also emphasizes, "only Proto-Aryan [i.e Indic and Iranian] among the early offshoots of Proto-Indo-European has a word for 'war-chariots'" (p.122).The Andronovo and the related Timber Grave culture (associated by Parpola with the Iranian Aryans) were responsible for the spread of the horse-driven lifestyle to China, which reveals its dependence on the Indo-Iranians in the numerous Chinese linguistic borrowings of horse names and equestrian mythological motifs.

According to Anthony, the Indo-Iranian cultural complex which developed at the eastern margin of the Yamnaya culture began around 2000 B.C., with the first evidence of chariotry. The earliest chariot burials are to be found in the Sintashta-Petrovka cultures east of the

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Ural Mountains, and graves of this culture also exhibit "many specific parallels with mortuary and sacrificial rituals described in the Rig Veda" (p.106). Sintashta-Petrovka is indeed the formative phase of the Andronovo culture specifically associated with the Indo-Aryans. Herding was a central economic activity in the Andronovo culture and the rituals included animal sacrifices, primarily cattle, sheep and goats, with special significance attached to horse-sacrifices. The definition of Aryan society was based on the sacred rituals of the Indo-Iranians and the Aryans "identified outsiders, non-Aryans, as those people who failed to conduct sacrifices to the Aryan gods" (p.108). The Indo-Iranian tribes spread their culture effectively through their use of swift chariots, and Anthony believes that the "movement of Caucasians into Xinjiang was connected in some way with this phenomenon" (p.109).

Parpola conjectures that the specifically Iranian branch of the Aryans may have come into being when the Karasuk culture of south Siberia and Mongolia - constituted of a Proto-Turkic population which exhibits a mixture of Europoid and Mongoloid features - overtook the Andronovo culture in eastern Kazakhstan around 1500 B.C. However, Parpola also considers it possible that the split between Iranians and Indians occurred much earlier in the Poltavkino-Abashevo culture in the North Pontic steppes. The Iranian element of the Proto-Aryan peoples may have spread out from the western Timber Grave culture in the second half of the second millennium B.C., with the advent of mounted pastoral nomadism.

The Scythians

The eastward spread of the Iranian tribes as far as Sinkiang was propelled principally by the Sakas or Scythians in the period after the final phase of the Bronze Age. The Saka language may have entered Sinkiang as early as 1000 B.C. and introduced horse nomadism and iron tools in the region.

Colin Renfrew also emphasizes the special importance of the horse-riding Scythians in the history of Indo-European conquest, for, with the onset of the Iron Age, in the first millennium B.C., the mounted horseman, rather than the chariot, became the instrument of elite dominance (p.206). The rise of the mounted warrior in Europe is traceable to the same date. In fact, Renfrew considers the Scythians, whom he derives from the Cimmerians, as Europeans, rather than Iranians, and thus presents a model of fourth millennium Proto-Indo-European family distribution as follows: European steppes: Proto-Scythian, Iranian plateau: Proto-Indo-Iranian, Central Asia:

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Proto-Tokharian (p.208).

The two essays by Davis-Kimball and by Chang and Tourtellotte deal with the Scythian nomadic cultures of the 6th to the 2nd centuries B.C. (starting from the Sauromatian and Sarmatian tribes) in the southern Ural steppes. The excavations at Tuzsai in particular reveal the impressive cultural level of the Sakas, "their strength as warriors, the richness of their burial kurgans and graves (thus indicating a chiefdom level society), and their skills as artisans of bronze, gold, and silver artifacts incorporating the famous Scythian 'animal' style" (Chang and Tourtellottte, p.270).

Scott Littleton offers an interesting thesis, akin to that of James Opie in the earlier collection, that some of the mummies of the Tarim Basin were in all likelihood Epi-Scythians, that is "eastern ethnic cousins of the ancient Scythians who, ca. 400 BCE, under a variety of ethnonyms – Alans, Sarmatians (or 'Sauromatians'), Massagetae, Thyssagetae, Saka, etc. – stretched from the lower Volga to the upper Yenisei" (p.746). Unlike Renfrew, Littleton considers these tribes to have been speakers of a North-Iranian language and to have spread as far east as the Tarim Basin. Indeed, this is confirmed by Dolkun Kamberi in his observations on the female mummy found in the Zaghunluq cemetery in Chaerchaen county which bears a 13-inch pointed felt of brown wool reminiscent of headgear seen in Persian bas-reliefs, for the Scythians are known in Persian histories as "Saka tigrakhauda" or "Sake, who wear pointed hats" (p.796). Kamberi even conjectures that the "3000 year-old mummified human remains may thus be related to the Saka people of that time, or may be thought of as early forerunners of the Uyghur people. Many of the artifacts found in the tomb, such as the clothing and food items are certainly very similar to those used by modern Uyghurs every day" (ibid.). [The word "uyghur" means coalition or federation, and designates a native mongoloid people who "have a long history of integrating with ancient Saka/Scythian, Sogdian, Hun and Tokharian peoples" (ibid.)].

The Tokharians

Karl Jettmar's article maintains that the Proto-Tokharians occupied the southeastern border zone of the contemporary area of Indo-European occupancy:[2]

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[2] In this, Jettmar differs from the editor, Mair, who positions the Proto-Tokharians in the northwestern region of the original Proto-Indo-European homeland (see below).

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> ...That was near to the areas where the "Anatolian" Indo-Europeans lived, in contact with North Caucasian tribes. Their neighbors during the following phase were Indo-Iranians, Proto-Greeks and Proto-Armenians, but even at this time they appear to have been in contact with Celtic and Italian dialects ... Afterwards, their neighbors were tribes who lived in Central and Eastern Europe, not only Proto-Teutons, but Proto-Balts or Proto-Slavs as well. From this position the Proto-Tocharians (already in contact with East Iranians) moved to the steppes of Middle Asia, where they associated with Finno-Ugrians and received through this mediation even East Iranian peculiarities ... Perhaps a Dravidian substratum was also involved in this process (p.216)

The Tokharians then moved even farther east until, finally, "together with Iranians and Tibetans, the Tocharians formed the core of a powerful nomadic confederation" (p.217). When the Tokharians were defeated by the Proto-Huns, the "Xiongnu", they moved west, to Bactria, from where they formed the powerful Kushan Empire of India.

As for the historical language of the Tokharians itself [the bulk of Tokharian documents that we possess today are translations of Sanskrit Buddhist texts], Werner Winter points out that it also exhibits peculiarities (especially in its astrological terminology) which suggest a possible link with Altaic [i.e. Turkic] nomads of the north and west of China. Georges-Jean Pinault too concludes in his article that 'The Tokharian speakers were members of a cultural continuum that included the Altaic peoples" (p.368). On the other hand, Douglas Adams' article focuses on similarities between Tokharian agricultural terms and Iranian irrigation technology, so that it seems likely that "Tokharian borrowed the words along with the technology from Iranian" (p.375). John Colarusso is confident that the Europoid physiognomy of the mummies, riding gear clothing, and "sun symbol tattoos" prove that the mummies spoke "early forms of [Iranian and Tokharian] branches of Indo-European, and in the oldest cases perhaps even Indo-European [i.e. Proto-Indo-European] itself or some late, slightly differentiated set of Indo-European dialects". However, either Indo-European pattern "would have exhibited a large admixture of non-Indo-European speech acquired somewhere along the vast migration routes or in western China itself from autochthonous Europoid or Mongoloid populations" (p.442).

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Tokharian and Scythian influence on Chinese Civilization

Alexander Lubotsky's paper on Tokharian loan words in Old Chinese demonstrates that a large number of Chinese terminology for chariotry and fortification, including town-building, is derived from "an Indo-European language" which he identifies as Tokharian, even though chariotry, as mentioned above, is a typical innovation of the Andronovo Indo-Aryans and first transmitted to their Iranian neighbours. So the Tokharian origins of the Chinese terminology must ultimately be due to the contacts of the Tokharians with the Eastern Iranian tribes postulated by Adams. Lin Meicun points to a few other possible loanwords in Chinese which may have Tokharian origins. The Yuezhi people, who may have been proto-Tokharians, had "already begun their commercial and cultural contact with the ancient inhabitants of the Yellow River Valley" (p.477), so that the Chinese word for honey 'mi', is clearly derived from Toch. B. 'mit'. Similarly, the Chinese word 'qilian', used as the name of a mountain (the Heavenly Mountain) in the Yuezhi people's homeland may be derived from the Tokharian word for heavenly 'qiluoman' and 'klyom' (holy, glory), related to the Latin 'caelum', which originally represented the luminous sky.

Juha Janhunen's article focuses on linguistic evidence for the horse in East Asia. He maintains that the horse is attested as early as the Neolithic period among the Proto-Indo-Europeans between the Southern Urals in the west and Western Altai in the east, which suggests that "it may, indeed, have been the very Proto-Indo-Europeans who first domesticated the horse, though we cannot rule out that the animal was at the same time already known to the linguistic ancestors of the Ugrians, Yeniscians and Turks" (p.416). The original homeland of the Mongols, however, was located not in Central Asia at all but, rather, in its northeastern periphery, perhaps in the western half of Southern Manchuria: "It is therefore possible that the Mongols received their basic horse terminology from some non-Mongolic ethnic group which inhabited the Mongolian steppes during the early protohistorical period" (p.425). However, the debt of the Mongoloid tribes to the Iron Age Europoid mummies of Xianjiang for their equestrian culture, though "tantalizing", is a "scientifically unverifiable possibility" (p.426).

The article by Jianjun Mei and Colin Shell on copper and bronze metallurgy in late prehistoric Xianjiang suggests that "copper or bronze came into use in Xianjiang after about 2000 B.C. and became widespread around 1000 B.C." (p.581). These dates, as well as the

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location of the bronze finds in the cemeteries containing the Europoid mummies, suggests that metallurgy was introduced into the region from the west. Ke Peng's article on the bronze artifacts discovered in Toquuztara county reveals the connections that this area had with the middle (1500-1000 B.C.) Andronovo (i.e. Indo-Aryan) cultures of Kazhakhstan. Michael Puett also reveals that the chariotry associated with the Indic Andronovo culture of the second millennium B.C. spread to northern China around 1200 B.C., when the first chariots are found in Anyang tombs (p.705). Iron technology too may have come from Central Asia, where it became widespread in the early first millennium B.C., and may have been largely imported by the Sakas of the eighth century B.C.

Elizabeth Barber and Irene Good provide two articles on the cloth finds of the Tarim Basin. The Tarim Basin reveals at least two different kinds of wool-working, the first emerging from the west possibly early in the second millennium B.C. with relatively simple weaves, while the second batch dating from several centuries later displays a new technique of twill weave and plaid twills similar to those of the prehistoric Kelts.

Barber, who focuses on the Loulan and Hami evidence, maintains that "the early Tarim inhabitants must ... have imported their woolly sheep and their knowledge of wool-working from much farther west" (p.648). The plaid twills found in the region bear a resemblance to the Proto-Keltic cloth finds from the salt mines at Hallstatt and Hallein in Europe, suggesting that both the eastern and western "Keltic" clothing derived from a region around the Caucasus during the third and second millennium B.C.

C. Scott Littleton conjectures that the Epi-Scythian impact on Mongoloid populations may have included the formation of the Japanese samurai and their ancient Korean counterparts as an oriental version of the Indo-Iranian warrior caste (the 'kshatriya'). Indeed, the practice of carrying two swords of unequal length resembles the similar practice among the Scythians and other ancient Northeast Iranian warriors. Littleton, finally, posits a possible link between the Wusun, who were an Epi-Scythian tribe of the end of the first millennium B.C., described in Chinese records as being bluish-green-eyed and red-haired, and the Yuezhi, who were Tokharians, suggesting that there might have been intimate contacts between these two groups.

Chen Chien-wen presents a more elaborate survey of the possible racial affinities of the Yuezhi peoples who are attested in ancient Chinese records (*History of the Later Han*). The Kushan Empire was

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created by the Greater Yuezhi and the Records of Nanzhou states that the "skin color of the people was reddish white, and they were skilled in shooting arrows and riding horses" (p.773). Some of the Yuezhi, however, may have mixed with possible Dravidian elements, or whatever earlier occupants of the steppelands they replaced, others with Mongoloid elements. Whether the Yuezhi spoke Iranian or Tokharian also remains debatable. Nevertheless, the reference to Qilian as the name of the "Heavenly Mountain" of the Yuezhi and the possible derivation of this word from Tokharian *kilyom* suggests that they may indeed have spoken Tokharian. The Lesser Yuezhi, also called "Hu", who stayed behind in Nanshan when the Yuezhi were forced to move to Bactria by the Xiongnu (or proto-Huns), are also described in the "Biography of Deng Xun" as possessing warrior habits and customs reminiscent of the Scythians.

Once again we are faced with the question of the close affinities of the Tokharians with the Scythians, even though the former are Europoid centum speakers, and the latter Indo-Iranian satem speakers. The pressing task at hand for Indo-Europeanists therefore is to determine the precise nature of the cultural contacts between these two peoples both in the Proto-Indo-European stage and in that of historical Tokharian. In this context, it should be noted that the Iranians themselves speak a language which occupies an intermediate stage between 'centum' and 'satem' which is demonstrated in their preference for the "h" phoneme (from "kh") rather than the "s" in words like "hoama" and "ahura" - compared to the Indic "soma" and "asura".

Victor Mair's concluding article goes some way towards offering an explanation of the spread of the early Indo-European languages east and west of their original homeland in the northern part of the region between the Black Sea and the Caspian Sea. In particular, he posits Tokharian as a "cousin" of the Germano-Baltic-Slavic branch of Indo-European and situated in the "central northwest of the mother PIE cell-body". This Tokharian element was "unceremoniously prodded by vigorous Celtic toward the only direction in which there was any hope of finding Lebensraum, the east" (p.843). For, the south was closed to it, on account of the fact that "Indo-Iranian was just beginning to flex its muscles and soon would be galloping across the steppes all the way to South Asia and East Asia". Pressed forward by the Iranians, the Tokharians sought refuge in the desolate but relatively safe Tarim Basin and it was in this area that they, along with later arrivals like the Scythians, Khotanese, Sogdians, and various Turkic groups, developed their peculiar culture which lasted until the

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Proto-Huns drove them out to Bactria and Ferghana, where they organized the mighty Kushan Empire. But, once settled in Bactria, the Tokharians were fully absorbed into the local Iranian culture, and Tokharian was lost forever as a living branch of the Indo-European family of languages.

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THE BRONZE AGE AND EARLY IRON AGE PEOPLES OF EASTERN CENTRAL ASIA

Monograph No. 26 (in Two Volumes)

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BOOK REVIEW ARTICLE

Evolutionary Origins: Pathways of the Human Predicament

Kevin Lamb
Washington, D.C.

The Inevitable Domination by Man:
An Evolutionary Detective Story
Seymour W. Itzkoff
Paideia Publishers, Ashfield, MA. 2000

Few scientific controversies are as enduring and contentious as the evolutionary track of human origins. From microbes to mammals to man, the course and direction of evolutionary development has given rise to theories and counter theories over the progressive continuity of selection, adaptation, and time-line of evolutionary change, which continues to divide anthropologists and paleontologists into rival camps. Seymour Itzkoff, the author of fifteen books, including a multi-volume series on the evolutionary origins of intelligence, comprehensively analyzes several unresolved crucial issues in this disputed area. Itzkoff provides a number of insightful observations in this up-to-date guide for those educated laymen who wish to obtain a comprehensive overview of animal evolution, and particularly of what happened in human prehistory. Indeed, those who are bewildered by the Out-of-Africa debate will benefit from this careful examination of the physical evidence.

The book is in a sense the culmination of the author's career of published findings on the all-important subject of human evolution, so vital to an understanding of humankind in its present predicament – an over-crowded and severely degraded world, which is exponentially deteriorating. In his Foreword, author Itzkoff explains the forces that have shaped his intellectual quest:

> In 1971 *Ernst Cassirer: Scientific Knowledge and the Concept of Man*, was published. It was the first of my two books on Cassirer. It was a study in the neo-Kantian tradition of the theory of knowledge, specifically dealing with the conundrum that this great 20'h-century Kantian addressed in his attempt to locate the broader cultural and biological sources for the symbolic forms of knowledge. Cassirer's

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concern was to understand the historical/evolutionary position of the symbolic forms in the panorama of human progress. Human knowledge and communication seemed to be unique expressions in the biological world of signs. We humans are biological creatures. The selective function of animal communication has been consistent along a vast spectrum of time. Yet the motivations that undergirded the symbolic forms of knowledge seemed to be inconsistent with this biological heritage.

My hesitant solution focused on the great orthoselective transformation that had seemingly produced the sapient brain. Human knowledge indeed seemed to derive from no overt survivalistic yearnings. At the same time, we could not place its sources in a higher "metaphysical" reality. We seemed to be sui generis compared to the shared needs of rats, chimpanzees, and algae. Yet we were products of the same ultimate bio-physical forces that created these other companions along the road.

My next exploration of this concern with the significance of human evolution was expressed in a four-volume series of books on the evolution of human intelligence, published between 1983-1990. This series confronted what to me had become a clear challenge to the universalistic civilizational vision of the neo-Kantians – the variability of human intelligence and its cultural products. How could we explain from the standpoint of human evolution this variability in individual capabilities and such great social differences? My conclusion: the variability was real, a product of a human species that was by no means homogeneous in its hegira forward in time and upward in corticalization from its root primate origins.

In *The Inevitable Domination by Man,* Itzkoff puts forth a evolutionary model for the coming of highly intelligent humans, which begins with the early sexually reproducing eukaryote cell, originating at least 1.5 - 2 billion years ago. The existence of an evolutionary environment of instability and change propelled a variety of ever more intelligent creatures into a positive adaptive and selective stance with nature. As such, Itzkoff argues that a highly intelligent creature dominating the Earth's surface was inevitable given the perdurance of our bio-chemical environment. He favors a traditional neo-Darwinian process of gradual evolutionary change in which the ancestors of humans long differentiated themselves from other mammal and primate lines, contra humans as "third chimpanzees". Cytogenetic evidence (pp. 128-131) harmonizes with recent DNA analysis to indicate only 30,000 genes in man, rather than 100,000 as formerly believed, as compared

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with the 15,000-20,000 genes in some primitive but specialized worms. The line of vertebrates leading to humans clearly separated and matured at an earlier stage in evolution than has hitherto been supposed. The strength of the argument that high intelligence and truly modern humans arose in the north far beyond what existed in the tropical zone of primate life is strongly buttressed by the wider evolutionary model developed in this book.

Because of the heavy political overtones associated with anything that explains the origins and diversity of the living peoples of the world, popular representation of the Out-of-Africa argument has been conducted in a frequently misleading and at times distorted manner. While few would question the evidence which points to man's primate having evolved in tropical climates, polemicists have sought to argue that what they euphemistically call "modern man" evolved as a virtually single sub-species in Africa (some even suggesting sub-Saharan Africa) and that only minimal evolutionary adaptations occurred amongst those populations which moved out of Africa. Indeed, some polemicists, motivated more by politics than by science, proceed to over-emphasize the biological similarities between those races whose more recent evolutionary history has been in temperate climates and those that have remained more closely adapted to sub-Saharan tropical environments. The fact that a major genetic division separates populations of Caucasoid and Mongoloid characteristics from those of sub-Saharan or Negroid character is seldom mentioned outside of academe.

In reviewing the evidence for the African Eve theory, Itzkoff expounds upon several well-established critiques of the inferential arguments that Allan Wilson and his colleagues articulated over computer generated models of the dating of mitochondria DNA. Such arguments conflict with the scientific evidence from the fossil record, and Itzkoff points to a number of illogical conjectures in the Out-of-Africa theory. For examples, he cites one critique from Dawkins and de Duve on the shortcomings of this computer generated model:

> One point is clear. The method used to construct the original tree was flawed. Other trees rooted at different times and in different geographical locations can be constructed from the same data.... It is highly unlikely that Eve could be more than 500,000 years old, 200,000 is a possibility.... It certainly does not mean that the whole of humankind is derived from a single couple or even that there may have been something special about eve.... If eve lived 200,000 years ago, she may have had 4,999 female cogeners, in which

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> case the survival of her line was due to chance and has no special meaning.... Perhaps a more probably alternative is that the present human race originates from a highly inbred population.

Much of the confusion over the African Eve concept arises from the loose use of the term "modern humans." Indeed, there is much confusion in scholarly writings and vast terminological confusion in popularizing and polemical works. Itzkoff avoids this by arguing with justification that the first truly "modern" humans known to paleolontologists were the Cro-Magnons, who might quite reasonably be seen as the ancestors of modern Europeans. But the Cro-Magnons extended beyond the borders of Europe, and their descendants spread out in successive waves of migration across Asia, and even back into Africa. There is still sound reason to argue that in these areas of colonization they may have admixed with older populations, and so created the vast array of diverse peoples or races that the world knows today.

Of course, this theory runs contrary to the scenario proposed by most of the African Eve, Out-of-Africa proponents, who see what they call "modern man" as having attained modernity on the African continent, and then migrated from thence around the rest of the world, replacing, without interbreeding with, the more primitive *Homo erectus* and Neanderthaloid species that were already occupying much of Asia and Australasia in a truly vast, racialist genocide. Their theory assumes group selection *in extremis*. Itzkoff reconsiders the evidence in dispassionately cogent terms. The idea that Africa was most probably the original homeland of our earliest forebears is not questioned but, he argues, there can be no doubt that Cro-Magnons, Caucasoids and Mongoloids attained their present characteristics in the much colder Eurasian region.

> The factual evidence, whether from a Eur-Asian "Garden of Eden" perspective or multi-regional position, argues for the full *Homo sapiens sapiens* realization of brain growth and cortical power to have first devolved upon the Eur-Asian Cro-Magnids. The positively selective cognitive impact of this morphology was demonstrated by its rapid if often deadly diffusion amongst all the ethnicities and races of humans around the world. This revolution in morphology and behavior is ongoing.

His survey concludes that the evidence indicates that Cro-Magnons or Cro-Magnon-like populations achieved their superior level of mental

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evolution in Western Eurasia, then migrated eastward to intermingle with remnants of older Asian populations to give us the modern Mongoloid-type populations of China, Korea and Japan. Thus he writes:

> The first Chinese dynasty, the Shang, is traditionally characterized by the Chinese themselves as governed by a red-haired, green-eyed people, possibly of Persian origin (much like characterizations of the original Mongol leadership, at 1200 A.D), who arrived on horse in the Yellow River Valley, at about 2,000 B.C. Shortly after, literacy was developed, the Chinese civilization thence taking its own uniquely developed Oriental route. Early dynastic iconography in China hints at the Caucasoid roots of this aristocracy, gradually to be largely effaced by a dominant modern Mongoloid phenotype.

Unfortunately, Itzkoff does not explore the origin of the Asian Negritoes, though there is a substantial likelihood that these may be descended from an early migration by African Negroid elements across southern, tropical Asia, never moving into the colder northern hinterland, and so retaining their tropical Negroid adaptations.

He continues:

> High intelligence speaks to the issue of individuals and populations having the capacity to express themselves symbolically in abstract structures of thought, whether they be in the arts, political and legal institutions, philosophy, science and technology, religion and ethics. Here we can refer to a traditional psychological construct, the "g" factor of general intelligence, now universally applied to evaluate individual potential for higher educational training.

And again:

> There can be no question today but that the evidence from pre-history, as well as recorded history, argues for this general correlation in the capacity to build civilizational institutions, then expressed in powerfully aggressive and expansive genetic and cultural dynamics. Even given the examples of relatively uncouth tribal peoples, Goths, Arabs, onools destrovino, rich if decade civilizations it is clear at these peoples were exemplifying their cultural potential in these military skills.

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Itzkoff properly places emphasis on the extent to which learned patterns of behavior have allowed man to frequently suppress or alter the direct expression of his genetic propensities and innate drives, in contrast to the behavior of other animals. It is interesting, however, that he occasionally speaks of human "freewill" without attempting to define or analyze this popular concept. In the popular mind, freewill is something that allows mankind to act contrary to the principles of scientific causality. It may be that the complexity of the mechanism of human behavior is such that what we call "freewill" is merely the obscure workings of genetically-conditioned impulses intertwined with learned behavior in such complexity that it defies explanation in causal terms, but reflects the fallacies of behaviorism. Regardless of such fine points, however, Itzkoff is quite right in stressing the role of what we conveniently call human "freewill," although we suspect the validity of the popular understanding of freewill as something above and outside causality.

But leaving aside this minor quibble, and admitting that a very broad range of authorities would still defend the possibility of something approximating to the popular concept of "freewill," Itzkoff makes a major contribution to the proper understanding of Man vis-a-vis Nature when he debunks the over-emphasis of so many current theorists on the over-riding power of culture to negate the forces of biology.

As he notes, his book

> ... is the product of a more detailed investigation into a number of important challenges to our scientific understanding of Homo's place in the evolutionary process and its present bio-cultural significance ... [several] contemporary intellectual trends constitute a threat to our ongoing ability to take our future rationally in hand in the contemporary dynamic of both social and biological change.
>
> The first is the view that we humans, with all of our unprecedented power over life and nature, are the accidental products of 4-plus billion years of evolution on the planet. Such a view would again lay us open to the kinds of 20 th century cultural and political manipulation by those who assert that we have no causally created "human nature."

Itzkoff consequently sees human behavior in this modern world as representing not simply a collaboration between cultural tendencies and the biological influences of the individual, but also often of a conflict between cultural forces and biological propensities developed in our

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long prehistory. Ideologies which ignore the realities of our biological limitations are delusional:

> High intelligence itself is not enough to discipline the ongoing war of humans against life on our Earth. The need seems to be for both educated and disciplined scientific rationality, the intellectual capacity to ward off those myths and hallucinations that can propel nations, indeed international society itself, into ideological crusades both for and against phantom utopias.

High intelligence, although not by itself a sufficient guarantee of human survival, is nevertheless a necessary endowment if future generations of man are to survive:

> ... only high, rational, scientifically educated intelligence can provide humankind the evidential options for decision making. Such long range planning by an intellectually and culturally diverse species depends in the first place on the disciplining of those explosively creative and expansive energies that emanate from the brain of *Homo sapiens sapiens*.

One other aspect of interest in Itzkoff's intriguing study relates directly to the title of the book. Mankind has come, inevitably, to dominate our planet and all forms of advanced plant and animal life on the planet. This could well lead to ecological disaster, since man's emotive drives, shaped as they are for survival under primitive conditions, have not yet responded to any rational warnings provided by his intellect. Man's primitive drive toward procreation, combined with the technological supremacy he has achieved over all competing life forms, threatens the environment on which all higher life forms depend. Whether or not man will irreparably damage the balance of the biosphere on which all higher life forms depend, including his own species, is a question which too few, even amongst the more advanced populations of today's world, are prepared to face. This is one of the more important topics explored in Itzkoff's study, as directly implied by the title, and the reviewer only wishes that the author had placed greater emphasis upon this threat. But as a concise exposition of what is known about human origins, and of the need to understand man's biological character as determined by his evolutionary history, this book stands far ahead of the field in terms of explaining the evolutionary role that shaped the current human predicament.

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Heredity and Humanity:
Race, Eugenics and Modern Science

Roger Pearson, Ph.D.

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BOOK REVIEW ARTICLE

Political Correctness is Corrupting Medicine

Edward M. Miller[1]
University of New Orleans

PC, M.D.
Sally Satel
Basic Books, 2000

Sally Satel, the author of PC, M.D. is a lecturer at Yale University who has practical experience in working with cocaine addicts. In her practice she has noticed that for success addicts need to want to change (and are often ambivalent about drugs), and need to take responsibility for getting better. A theme of this book is how modern trends for regarding people as members of victimized groups prevents them from taking responsibility for their own health.

This shows up in the discussion of feminist counseling and multicultural counseling. In these, the emphasis is on political action and the status of women or oppressed peoples. The basic problem with the therapies is that there is no evidence that they work. However, there is a major risk of diverting the patient from what he can do to solve his own problems. They also appear to violate the generally agreed ethical standard that the therapist should not thrust his values on the patient.

Likewise, the tale is told of the crack moms of South Carolina. That state tried to get them into treatment using the threat of arrest and imprisonment for child neglect or the delivery of drugs to a minor if they used drugs just prior to delivery, tested positive for drugs more than once during the third trimester, or if they refused treatment for drugs. The goal was to get the women into treatment for their children's sake. From a medical viewpoint the program worked. The number of cocaine positive drug tests among pregnant moms dropped from more than 20 per month to 5 or 6. The program produced the predictable outcry among the civil rights establishments, both among those who disliked the idea of forced testing, and among those charging

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racism because most of the affected mothers were black. Incidentally, since the book was published the US Supreme Court has held that the required blood testing of the South Carolina women with possibility of unfavorable results being sent to the police constituted an improper search.

Satel quotes the joke about how many psychiatrists does it take to change a light bulb (only one, *but the bulb must want to change*!). She believes (partially based on her own experience with addicts) that for any hope of success the patients must try to change. In her experience most addicts are somewhat ambivalent. The outside world often can supply the pressure needed to induce them to accept the responsibility of changing. The threat of imprisonment or of losing their children is one way to apply such pressure. Addicts are notoriously poor self-disciplinarians and treatment programs should help to provide them the discipline they lack.

To Satel's credit she avoids overstating the damaging effects of cocaine, stating that follow up studies have failed to find the "horribly brain-damaged cohort of ghetto children predicted in the 1980's". From better studies it now appears that the effect of cocaine use on IQ is only about three points. However, the environment provided by addicted parents is very bad in many ways and few would doubt that getting mothers off of the drugs is highly desirable.

One successful program offers mothers $200 for undergoing sterilization or $50 if they will obtain a sustained-release hormonal birth control pill, such as Norplant. As of the summer of 1999 the program had paid 57 women. These women had been pregnant a total of 423 times already, resulting in 161 abortions, 40 dead babies, and 175 babies in foster care. Arithmetic shows only 47 remained with their mothers, indicating that the large majority of the offspring were ending up in foster care. Given the high cost of foster care and abortions, such a program could be justified on purely financial grounds, and is amazingly cheap (I would not have expected many to accept sterilization at only at $200). Yet despite its success, this privately financed program has attracted great criticism.

Satel critiques the tendency to regard those who are mentally sick or addicted as victims. She attacks the idea that public health profession should be social reformers, fighting to reform society and to eliminate inequality. She recognizes that death and sickness rates are higher among the poor and among certain minorities. However, most of this is not because poverty causes disease, although poverty per se does make it harder to obtain quality medical care. She argues that the

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public health profession is unlikely to do much to change society. Unfortunately, efforts to effect social reform tend to divert effort (and training resources) away from the traditional causes of disease which the public health profession *could* do something about. Actions such as improving sanitation and teaching the public about health-promoting lifestyle measures (such as weight control, good nutrition, stopping smoking, getting exercise, vaccinating children, maintaining sanitation) are likely to be neglected when the public is told that bad health is due to poverty, racism, and sexism. Members of racial minorities need to be told what they can do to improve their own health, not be led to blame others.

Perhaps the most amazing part of the book is the account of how "Therapeutic Touch" has become an accepted therapy taught in many schools of nursing. This technique is based on the idea that diseases are caused by disturbances in the energy field surrounding patients, and can be cured by appropriately moving the hand around the body of the patients (without actually touching the patient). There is no scientific support for this idea, and yet this technique has become widely taught in nursing schools. Part of the incentive for accepting this appears to be hostility to male dominated traditional science based medicine.

A chapter titled "Inmates Take Over the Asylum" discusses how ex-patients have used the language of victimization and civil rights to argue against outpatient involuntary treatment, and in some cases against all forms of compulsory treatment. The issue here is that there are patients that go through a cycle of mental illness, possibly including being involuntarily confined. In hospital they are forced to take their drugs. This returns them to a state where they are not a hazard to themselves or to others (or can convince a judge of this). They are then released. Once released, they stop taking their medicines. Soon they are again ill enough to threaten both themselves and others. They are then rehospitalized. Some people go through this cycle repeatedly until they either hurt themselves badly or hurt someone else. One solution is outpatient commitment where they are required to take their drugs or are housed in a community residence where one of the conditions is that they undergo treatment.

Interestingly, many of the ex-patients who use the language of victimization are actually benefiting from government programs where they are paid to push their political agenda, arguing against treatment for others.

This chapter documents that certain mentally ill individuals are indeed more likely to commit crimes. In an effort to avoid

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stigmatization of the mentally ill there has been a major effort to convince the public that the mentally ill are no more likely to commit crimes than other individuals. However, this is false. A Finnish study showed that schizophrenics had seven to ten times the risk of committing homicide as members of the general population. A study of 300 releases from Napa Valley State Hospital showed that their arrest rate for violent crimes was ten times that of the general population. A quarter of the offspring who kill their parents have a history of serious mental illness. A well-publicized 1998 study that found no difference in the rates of commission of violent acts between a sample of mentally ill people and the general population suffered from the fact that the sample excluded subjects with the greatest potential for aggression.

Naturally, affirmative action is discussed. Under pressure to train more minority nurses, California state nursing programs offered by community colleges have been mandated to adopt either "discrimination-proof" admission systems based on lotteries or a first-come first-served waiting list made up of students with at least a C in prerequisite courses. Such an extreme measure implies that some students with higher grades will be turned away. As would be predicted, drop out rates roughly doubled under the new admission rules. Given that at least some of the decisions made by nurses benefit from high intelligence and that some of the decisions can be life affecting (such as calculating the correct doses of drugs, or knowing which symptoms call for immediate emergency action), this change can be presumed to threaten patients health (including that of minority patients). Although Dr. Satel does not make this point, the threat was well documented by Harvard Medical School professor Bernard D. Davis in his 1986 book *Storm over Biology* (see Pearson, 1997).

The major medical schools and medical associations seem to have accepted the goal of raising the proportion of underrepresented minorities (blacks, Hispanics, American Indians) in the profession. Satel documents how this has involved lowering standards. Data from the American Association of Medical Colleges shows that a low scoring minority applicant had a 30% chance of admission to medical schools while a white student with the same scores had only a 10% chance of admission. Not surprisingly, this results in greater failures to graduate among minority students. In 1996, 39% of minority students did not graduate after four years, compared with only 15% of non-minority students. The percentage of black students who had failed the first part of the National Medical Boards was 51%, compared with a rate of less than 12% for white students.

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Given the complexity of modern medicine, this lowering of standards can be expected to result in poorer health care. An implication for the consumer of medical care who frequently has to pick a doctor out of a phone book or from a list provided by a HMO with little additional information (my HMO refused to reveal the training of the doctor I was considering) should avoid minority doctors. Those who choose a minority doctor may a fair chance of finding that they have selected one who got into medical school through affirmative action, and who on a statistical basis is unlikely to provide as good care as a white or Asian doctor who did not benefit from preferential admission. This is a straightforward application of Bayes theorem (Miller 1994), and is a conclusion that applies equally well to minority as well as majority patients (needless to say, non-English speaking minority patients are justified in taking this risk when they seek someone from their own group who speaks their language).

Satel does not discuss the reason for the unavoidable trade-off between achieving proportional representation in medicine and the maintenance of standards. However, to someone familiar with the literature on intelligence and performance the explanation is clear, even if it is one that people don't want to talk about. Because the average intelligence of blacks is about one standard deviation lower than for whites, there are fewer blacks able to meet the standards traditional for admittance to medical schools, and those that have the requisite mental acuity for a successful career in medicine find an attractive variety of highly attractive alternative career opportunities open to them.

Different aspects of this situation have been discussed in a number of books including ones by Herrnstein & Murray (1994), Levin (1997), Jensen (1998), Brand (1996) and Zelnick, Bob (1996). I have written review articles that summarize the major findings of these books (Miller, 1995, 1996, 1998, 1999), some in this journal. Basic conclusions of this literature are that intelligence contributes to the successful performance of most jobs (medical jobs are among this group) and that there are differences between major population groups in their intelligence. While the existence of the trade-off between proportional representation and quality medical services would hold regardless of the causes for the differences in average intelligence between races, the evidence (Jensen 1998) points to the differences being genetic. Given the organized opposition (see Pearson 1997) to discussing racial differences in intelligence, it is understandable why Satel stayed away from this topic. However, her failure to discuss this aspect of the problem does not detract from the value of the topics she does discuss.

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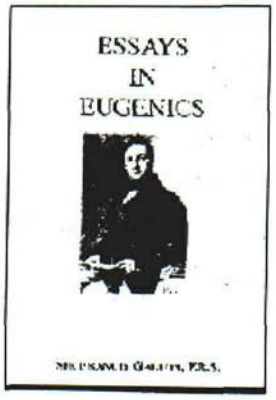

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